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U. S. DEPARTMENT OF AGRICULTURE.
DIVISION OF BOTANY.

CONTRIBUTIONS

FROM

THE U. S. NATIONAL HERBARIUM.

Vol. VII, No. 1.

ISSUED DECEMBER 31, 1900.

MONOGRAPH OF THE NORTH AMERICAN UMBELLIFERAE.

BY

JOHN M. COULTER and J. N. ROSE.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1900.

LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
DIVISION OF BOTANY,
Washington, D. C., August 16, 1900.

SIR: I have the honor to transmit herewith and to recommend for publication as Contributions from the United States National Herbarium Volume VII, No. 1, a manuscript by John M. Coulter and J. N. Rose, entitled "Monograph of the North American Umbelliferae."

Respectfully,

FREDERICK V. COVILLE,
Botanist.

HON. JAMES WILSON,
Secretary of Agriculture.

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MONOGRAPH OF THE NORTH AMERICAN UMBELLIFERAE.[1]

By JOHN M. COULTER and J. N. ROSE.

INTRODUCTION.

In 1888 we published the Revision of North American Umbelliferae.[2] This was the first general presentation of the North American species since Torrey and Gray's account of the family in the Flora of North America, which appeared in 1840. In the twelve years which have elapsed the work of botanical exploration has proceeded with remarkable activity, and the additional material which has come into our hands has far exceeded all expectation. Since the appearance of the Revision descriptions of numerous new species and genera have appeared in various publications. The adjacent floras of Mexico and Central America have also yielded an enormous return for diligent exploration, and their rich display of Umbelliferae has helped to a better understanding of our own species. In the meantime conceptions of genera and species have been shifting in the direction of a more exact definition of forms, and especially has the idea of the importance of an exact knowledge concerning types and type localities developed. To crown all of this the monograph of the genera of Umbelliferae by Drude, in Engler and Prantl's Natuerlichen Pflanzenfamilien, appeared in 1898, which defined the genera and indicated their relationships with a completeness which had never been attained before. In consideration of all of these facts the time seemed ripe to us for a new presentation of our North American species. For convenience of reference, rather than for any special appropriateness in the name, we have decided to call this a Monograph rather than a second Revision.

In the preface to our former revision there is given a list of the publications containing descriptions of new species since Torrey and Gray's Flora. This list, with certain corrections and omissions, is here reproduced. Works in which new names only occur are also included.

[1] Although we have used the name Umbelliferae for this family throughout this work, yet it is proper to state that the name Apiaceae has been adopted by a number of American botanists, and has so appeared in several numbers of the Contributions.

[2] Coulter, John M., and Rose, J. N. Revision of North American Umbelliferae. Crawfordsville, Indiana. December, 1888. Pp. 1–144, pls. 1–9.

This list is here preceded by a condensed bibliography of all the works from Linnaeus's Species Plantarum to Torrey and Gray's Flora, which contain new names or new descriptions of Umbelliferae included in our range. Following these two lists will be found a similar list of publications containing new species and new names published since the Revision and before the present Monograph.

BIBLIOGRAPHY FROM 1753 TO 1840.

LINNAEUS: Sp. Pl. (1753), 19 spp.; ed. 2 (1763), 1 sp.; Syst. ed. 12, vol. 2 (1767), 1 sp.
LINNAEUS, f.: Syst. Veg. Suppl. (1781), 1 sp.
HUDSON, WM.: Fl. Angl. (1763), 1 sp.
CRANTZ, H. J. N.: Umbell. (1767), 1 sp.
WALTER, T.: Fl. Car. (1788), 5 spp.
LA MARCK, J. B. P.: Encycl. vol. 3 (1789), 2 spp.; vol. 4 (1796), 2 spp.
GMELIN, J. F.: Syst. vol. 2 (1791), 1 sp.
CYRILLI, D.: Pl. Rar. Neap. fasc. 2 (1792), 1 sp.
THUNBERG, C. P.: Dess. vol. 2 (1800), 1 sp.
MICHAUX, A.: Fl. Bor. Am. vol. 1 (1803), 13 spp.
PERSOON, C. H.: Syn. Plant. vol. 1 (1805), 1 sp.
DE LA ROCHE, F.: Eryng. (1808), 1 sp.
MUHLENBERG, D. H. E.: Cat. (1813), 3 spp.; ed. 2 (1818), 1 sp.
PURSH, F.: Fl. Am. Sept. vols. 1 and 2 (1814), 5 spp.
HOFFMANN, G. F.: Gen. Pl. Umbell. (1814), 1 sp.; ed. 2 (1816), no species.
NUTTALL, T.: Gen. vol. 1 (1818), 13 spp.
ELLIOTT, S.: Bot. S. Car. Georg. vol. 1 (1821), 2 spp.
KOCH, G. D. I.: Nov. Acad. Caes. Leop. vol. 12 (1824), 1 sp.
ROEHLING, J. C.: Deutschland Flora, vol. 2 (1826), 2 sp.
TORREY, JOHN: Fl. N. and Mid. U. S. (1824), 2 spp.; Ann. Lyc. N. Y. vol. 2 (1828), 1 sp.
CHAMISSO & SCHLECHTENDAL: Linnaea, vol. 1 (1826), 1 sp.
DE CANDOLLE, A.: Mém. Soc. Phys. Genev. vol. 4 (1828), 1 sp.; Coll. Mém. vol. 5 (1829), 13 spp.; Prodr. vol. 4 (1830), 14 spp.
RAFINESQUE, C. S.: Journ. Phys. vol. 89 (1819), 1 sp.; Seringe, Bull. Bot. (1830), 3 spp.
SPRENGEL, K.: Syst. vol. 1 (1825), 1 sp.; in Roem. & Schultes, Syst. vol. 6 (1820), 2 spp.
HOOKER & ARNOTT: Bot. Beech. (1832 and 1840), 10 spp.
HOOKER, WM.: Fl. Bor. Am. vol. 1 (1834), 5 spp.
CHAPMAN, A. W.: *See* Torrey & Gray Fl. N. Amer. vol. 1 (1840), 1 sp.
NUTTALL, T.: Journ. Phila. Acad. vol. 7 (1834), 2 spp.
HOOKER, WM.: Comp. Bot. Mag. vol. 1 (1835), 1 sp.
TORREY & GRAY: Fl. vol. 1 (1840), 58 spp.

BIBLIOGRAPHY FROM 1841 TO 1888.

WALPERS, S. W. G.: Repert. vol. 2 (1843), 1 sp.
BUCKLEY, S. B.: Am. Journ. Sci. ser. I, vol. 45 (1843), 2 spp.; Proc. Acad. Phila. [vol. 13] (1862), 1 sp.
LEDEBOUR, K. F.: Flora Rossica, vol. 2 (1844), 1 sp.
ENGELMANN & GRAY: Bost. Journ. Nat. Hist. vol. 5 (1845) and vol. 6 (1850), 3 spp.
HOOKER, W. J.: Lond. Journ. Bot. vol. 6 (1847), 8 spp.
GRAY, A.: Pl. Fendl. (1849), 3 spp.; Pl. Wright. (1850), 3 spp.; Pl. Lindheim. (1850), 3 spp.; Manual, ed. 2 (1856), 5 spp.; ed. 5 (1867), 2 spp.; Proc. Am. Acad. vol. 6 (1865), 6 spp.; vol. 7 (1868), 19 spp.; vol. 8 (1870), 7 spp.; Pacif. R. Rep. vol. 12[2] (1860), 1 sp.; Ives' Report (1861), 1 sp.; Am. Journ. Sci. ser. II, vol. 33 (1862), 1 sp.; Proc. Acad. Phila. [vol. 15] (1863), 2 sp.
BENTHAM, G.: Pl. Hartw. (1849), 2 spp.

TORREY, JOHN: Stansb. Rep. (1852), 1 sp.; Journ. Acad. Phila. ser. II, vol. 3 (1855), 1 sp.; Bot. Mex. Bound. Surv. (1859), 1 sp.; Pacif. R. Rep. 4[1] (1856), 4 spp.
SCHLECHTENDAL, D. F. L.: Linnæa, vol. 26 (1853), 1 sp.
TORREY & GRAY: Pacif. R. Rep. vol. 2 (1855), 2 spp.
CHAPMAN, A. W.: Fl. Southern States (1860), 1 sp.
WOOD, A.: Class-book, ed. 2 (1860), 2 spp.; Bot. and Flor. (1870), 3 spp.
MUELLER, F.: Fl. Austral. vol. 3 (1866), 1 sp.
BENTHAM & HOOKER: Gen. Pl. vol. 1 (1867), 3 spp.
SCHMIDT, F.: Mém. Acad. Petrop. ser. VII, vol. 12 (1868), 1 sp.; in Miq. Ann. Mus. Bot. Lugd. Bat. vol. 3 (1867), 1 sp.
WATSON, S.: Bot. King Surv. (1871), 15 spp.; Am. Nat. vol. 7 (1873), 3 spp; Bot. Calif. (1876 and 1880), 2 spp.; Proc. Am. Acad. vol. 11 (1876), 11 spp.; vol. 12 (1877), 1 sp.; vol. 14 (1879), 2 spp.; vol. 17 (1882), 2 spp.; vol. 18 (1883), 1 sp.; vol. 20 (1885), 5 spp.; vol. 21 (1886), 3 spp.; vol. 22 (1887), 7 spp.; Bibliog. Index (1878), 9 spp.
NUTTALL, T.: Wilkes Expl. Exped. vol. 17 (1874), 1 sp.
PARRY, C. C.: Am. Nat. vol. 9 (1875). No species.
KELLOGG, A.: Bot. Calif. vols. 1 and 2 (1876 and 1880), 2 spp.
URBAN, I.: Martius Fl. Bras. vol. 11[1] (1879), 2 spp.
JONES, M. E.: Am. Nat. vol. 17 (1883), 1 sp.
CURRAN, M. K.: Bull. Calif. Acad. 1 (1885), 1 sp.
ENGELMANN, GEO.: Proc. Am. Acad. vol. 21 (1886), 1 sp.
MORONG, T.: Bull. Torr. Bot. Club, vol. 14 (1887), 1 sp.
BRITTON, N. L.: Bull. Torr. Bot. Club, vol. 14 (1887), 1 sp.
BRITTON, STERNS, & POGGENBURG: Prel. Cat. N. Y. (1888), 3 spp.
COULTER, J. M. & ROSE, J. N.: Bot. Gaz. vol. 12 (1887), 14 spp.; vol. 13 (1888), 22 spp.; Rev. N. Am. Umbel. (1888), 57 spp.

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GREENE, E. L.: Pittonia, vols. 1 (1889) and 2 (1889–90), 9 spp.; Erythea, vols. 1 (1893) and 3 (1895), 5 spp.; Man. Bot. Bay Reg. (1894), 1 sp.
COULTER and ROSE: Bot. Gaz. vols. 14 (1889), 15 (1890), 20 (1895), and 24 (1897), spp. 15; Contr. Nat. Herb. vols. 1 (1893), 3 (1895-96), 4 (1893), and 5 (1899), 9 spp.; Wash. Acad. Sci. vol. 1 (1900), 1 sp.
BRITTON, N. L.: Mem. Torr. Club, vols. 2 (1890) and 5 (1894), 6 spp.; Bull. Torr. Bot. Club, vol. 14 (1887), 1 sp.; Ill. Fl. vol. 2 (1897), 4 spp.
HITCHCOCK, A. S.: Trans. St. Louis Acad. vol. 5 (1891), 1 sp.
JONES, M. E.: Zoe, vols. 2 (1891), 3 and 4 (1893), 6 spp.; Proc. Cal. Acad. ser. II, vol. 5 (1895), 6 spp.; Contr. Western Bot. no. 8 (1898), 7 spp.
KUNTZE, OTTO: Rev. Gen. Pl. vol. 1 (1891), 7 spp.
COVILLE, F. V.: Contr. Nat. Herb. vol. 4 (1893), 1 sp.
JEPSON, W. L.: Erythea, vols. 1 (1893) and 5 (1897), 6 spp.
RYDBERG, P. A.: Bot. Surv. Nebr. vol. 3 (1894), 1 sp.; Mem. N. Y. Bot. Garden, vol. 1 (1900), 2 spp.
BICKNELL, E. P.: Bull. Torr. Bot. Club, vols. 22 (1895) and 24 (1897), 4 spp.
HELLER, A. A.: Contr. Herb. Franklin & Marshall Coll. vol. 1 (1895), 1 sp.; Bull. Torr. Bot. Club, vol. 24 (1897), 1 sp.; Cat. N. Am. Pl. (1898), 2 spp.
HEMSLEY, W. B.: Hook. Icon. ser. IV, vol. 6 (1897), 1 sp.
DRUDE, O.: Engler and Prantl's Nat. Pflanzenfam. vol. 3, pt. 8 (1898), 2 spp.
EASTWOOD, Miss A.: Proc. Cal. Acad. Sci. ser. III, vol. 1 (1898), 1 sp.
HOWELL, THOMAS: Fl. N. W. Am. vol. 1 (1898), 2 spp.
NELSON, A.: Bull. Torr. Bot. Club, vols. 25 (1898) and 26 (1899), 3 spp.
PIPER, C. V.: Erythea, vol. 6 (1898), 1 sp.
HENDERSON, L. F.: Contr. Nat. Herb. vol. 5 (1899), 1 sp.
CONDON, J. W.: Erythea, vol. 7 (1900), 1 sp.

The total number of new species and names appearing in the last list is 109. The new genera (4) and species or subspecies (68) which appeared in the publications cited in the same list are as follow, the name appearing in every case as originally published:

NEW GENERA.

Hesperogenia C. & R.
Leibergia C. & R.
Taenidia Drude.
Taenioplenrum C. & R.

NEW SPECIES.

Angelica ampla A. Nelson.
Angelica californica Jepson.
Angelica roseana Henderson.
Carum lemmoni C. & R.
Cicuta occidentalis Greene.
Cicuta purpurata Greene.
Cicuta vagans Greene.
Cymopterus bulbosus A. Nelson.
Cymopterus calcareus Jones.
Cymopterus decipiens Jones.
Cymopterus ibapensis Jones.
Cymopterus megacephalus Jones.
Cymopterus newberryi alatus Jones.
Cymopterus montanus pedunculatus Jones.
Cymopterus panamintensis C. & R.
Cymopterus petraeus Jones.
Cymopterus utahensis Jones.
Cymopterus utahensis eastwoodae Jones.
Cymopterus utahensis monocephalus Jones.
Eryngium alismaefolium Greene.
Eryngium aristulatum Jepson.
Eryngium lemmoni C. & R.
Eryngium sparganophyllum Hemsl.
Eulophus parishii rusbyi C. & R.
Hesperogenia stricklandi C. & R.
Hydrocotyle bonariensis texana C. & R.
Leibergia orogenioides C. & R.
Leptotaenia californica platycarpa Jepson.
Leptotaenia californica dilatata Jepson.
Leptotaenia minor Rose.
Ligusticum eastwoodae C. & R.
Ligusticum goldmani C. & R.
Ligusticum macounii C. & R.
Lilaeopsis carolinensis C. & R.
Lilaeopsis occidentalis C. & R.
Musineon vaginatum Rydberg.
Peucedanum argense Jones.
Peucedanum confusum Piper.
Peucedanum erosum Jepson.
Peucedanum evittatum C. & R.
Peucedanum gormani Howell.
Peucedanum hassei C. & R.
Peucedanum insulare Eastwood.
Peucedanum juniperinum Jones.
Peucedanum lapidosum Jones.
Peucedanum lemmoni C. & R.
Peucedanum megarrhiza A. Nelson.
Peucedanum nevadense cupulatum Jones.
Peucedanum plummerae C. & R.
Peucedanum robustum Jepson.
Peucedanum salmoniflorum C. & R.
Peucedanum scopulorum Jones.
Peucedanum torreyi C. & R.
Peucedanum triternatum robustius C. & R.
Sanicula divaricata Greene.
Sanicula floridana Bicknell.
Sanicula gregaria Bicknell.
Sanicula nemoralis Greene.
Sanicula saxatilis Greene.
Sanicula septentrionalis Greene.
Sanicula smallii Bicknell.
Sanicula trifoliata Bicknell.
Selinum eryngiifolium Greene.
Selinum validum Congdon.
Sium heterophyllum Greene.
Velaea arguta ternata C. &. R.
Velaea glauca C. & R.
Washingtonia divaricata Britton.
Washingtonia intermedia Rydberg.

The new names or new combinations (40) which have appeared since our Revision, in 1888, are as follows:

Adorium lucidum Kuntze, Rev. Gen. Pl. **1**: 264. 1891.
Anidrum americanum Kuntze, Rev. Gen. Pl. **1**: 264. 1891.
Archangelica villosa Kuntze, Rev. Gen. Pl. **1**: 265. 1891.
Ataenia howellii Greene, Pittonia **1**: 274. 1889.
Ataenia kelloggii Greene, Pittonia **1**: 274. 1889.
Ataenia oregana Greene, Pittonia **1**: 274. 1889.
Berula erecta Coville, Contr. Nat. Herb. **4**: 115. 1893.
Conioselinum bipinnatum Britton, Bull. Torr. Bot. Club, **14**: 233. 1887.
Cymopterus acaulis Rydberg, Bot. Surv. Nebr. **3**: 38. 1894.
Cymopterus lapidosus Jones, Contr. Western Botany no. 8: 31. 1898.
Cymopterus newberryi Jones, Zoe **4**: 47. 1893.
Cymopterus newberryi jonesii Jones, Proc. Cal. Acad. ser. II, **5**: 684. 1895.
Cymopterus parryi Jones, Zoe **4**: 48. 1893.
Deringa canadensis Kuntze, Rev. Gen. Pl. **1**: 266. 1891.
Hallomuellera lineata Kuntze, Rev. Gen. Pl. **1**: 267. 1891.
Ligusticum canadense Britton, Mem. Torr. Club, **5**: 240. 1894.
Lilaeopsis lineata Greene, Pittonia **2**: 192. 1891.
Lilaeopsis schaffneriana C. & R. Bot. Gaz. **24**: 48. 1897.
Musineon divaricatum C. & R., Bot. Gaz. **20**: 259. 1895.
Myrrhis nuda Greene, Man. Bot. Bay Reg. 157. 1894.
Oxypolis fendleri Heller, Bull. Torr. Bot. Club **24**: 478. 1897.
Oxypolis filiformis Britton, Mem. Torr. Club **5**: 239. 1894.
Oxypolis rigidior longifolia Britton, Mem. Torr. Club **5**: 239. 1894.
Oxypolis ternata Heller, Cat. N. Am. Pl. 5. 1898.
Ptilimnium laciniatum Kuntze, Rev. Gen. Pl. **1**: 269. 1891.
Ptilimnium nuttallii Britton, Mem. Torr. Club **5**: 244. 1894.
Sanicula canadensis marylandica Hitchcock, Trans. St. Louis Acad. **5**: 497. 1891.
Spermolepis divaricatus Britton, Mem. Torr. Club **5**: 244. 1894.
Spermolepis echinatus Heller, Contr. Herb. Franklin & Marshall Coll. **1**: 73. 1895.
Taenidia integerrima Drude, Engler & Prantl, Nat. Pflanzenfam. **3**^{8}: 195. 1898.
Taeniopleurum howellii, Bot. Gaz. **14**: 284. 1889.
Thaspium trifoliatum aureum Britton, Mem. Torr. Club **5**: 240. 1894.
Uraspermum nudum Kuntze, Rev. Gen. Pl. **1**: 270. 1891.
Velaea texana Drude, l. c. 169. 1898.
Washingtonia brachypoda Heller, Cat. N. Am. Pl. 5. 1898.
Washingtonia claytoni Britton in Britt. & Br. Ill. Fl. **2**: 530. 1897.
Washingtonia intermedia Rydberg, Mem. N. Y. Bot. Garden **1**: 289. 1900.
Washingtonia longistylis Britton in Britt. & Br. Ill. Fl. **2**: 530. 1897.
Washingtonia nuda Heller, Cat. N. Am. Pl. 5. 1898.
Zizia bebbii Britton, Mem. Torr. Club **2**: 35. 1890.

A comparison of the genera and species presented by the Revision and the Monograph will serve to illustrate the development of our knowledge of the family. The Revision contained 52 native genera and 217 native species, to which may be added 7 introduced genera and 16 introduced species. The Monograph contains 62 native genera and 332 native species; and in addition 16 introduced genera and 39 introduced species.

A tabular statement presenting this comparison in greater detail is as follows:

Generic representation in the Revision.

Genus.	Native species.	Introduced species.	Whole number of species.	Genus.	Native species.	Introduced species.	Whole number of species.
1. Aegopodium	.....	1	1	31. Eurytaenia	1	.....	1
2. Aethusa	.....	1	1	32. Foeniculum	.....	1	1
3. Aletes	1	.....	1	33. Harbouria	1	.....	1
4. Ammoselinum	2	.....	2	34. Heracleum	1	.....	1
5. Angelica	16	.....	16	35. Hydrocotyle	7	.....	7
6. Anthriscus	.....	1	1	36. Leptocaulis	2	.....	2
7. Apiastrum	2	.....	2	37. Leptotaenia	7	.....	7
8. Apium	1	3	4	38. Ligusticum	9	.....	9
9. Berula	1	.....	1	39. Museniopsis	1	.....	1
10. Bifora	1	.....	1	40. Musenium	3	.....	3
11. Bowlesia	1	.....	1	41. Oenanthe	1	.....	1
12. Bupleurum	1	1	2	42. Oreoxis	1	.....	1
13. Carum	4	1	5	43. Orogenia	2	.....	2
14. Caucalis	1	2	3	44. Osmorhiza	6	.....	6
15. Chaerophyllum	1	.....	1	45. Pastinaca	.....	1	1
16. Cicuta	3	.....	3	46. Peucedanum	43	.....	43
17. Coelopleurum	2	.....	2	47. Phellopterus	1	.....	1
18. Coloptera	3	.....	3	48. Pimpinella	2	1	3
19. Conioselinum	1	.....	1	49. Podistera	1	.....	1
20. Conium	.....	1	1	50. Polytaenia	1	.....	1
21. Coriandrum	.....	1	1	51. Pseudocymopterus	3	.....	3
22. Crantzia	1	.....	1	52. Sanicula	10	.....	10
23. Cryptotaenia	1	.....	1	53. Selinum	7	.....	7
24. Cymopterus	13	.....	13	54. Sium	2	.....	2
25. Cynosciadium	2	.....	2	55. Thaspium	3	.....	3
26. Daucus	1	1	2	56. Tiedemannia	4	.....	4
27. Discopleura	2	.....	2	57. Trepocarpus	1	.....	1
28. Erigenia	1	.....	1	58. Velaea	6	.....	6
29. Eryngium	22	.....	22	59. Zizia	2	.....	2
30. Eulophus	5	.....	5	Total	217	16	233

Generic representation in the Monograph.

Genus.	Native species.	Introduced species.	Whole number of species.	Genus.	Native species.	Introduced species.	Whole number of species.
1. Aegopodium	.....	1	1	41. Heracleum	1	1	2
2. Aethusa	.....	1	1	42. Hesperogenia	1	.....	1
3. Aletes	4	.....	4	43. Hydrocotyle	9	.....	9
4. Ammi	.....	2	2	44. Imperatoria	.....	1	1
5. Ammoselinum	3	.....	3	45. Leibergia	1	.....	1
6. Anethum	.....	1	1	46. Leptotaenia	11	.....	11
7. Angelica	21	.....	21	47. Levisticum	.....	1	1
8. Anthriscus	.....	3	3	48. Ligusticum	20	.....	20
9. Apiastrum	2	.....	2	49. Lilaeopsis	4	.....	4
10. Apium	1	3	4	50. Lomatium	58	.....	58
11. Aulospermum	9	.....	9	51. Museniopsis	1	.....	1
12. Berula	1	.....	1	52. Musineon	4	.....	4
13. Bifora	1	1	2	53. Oenanthe	1	1	2
14. Bowlesia	1	.....	1	54. Oreoxis	3	.....	3
15. Bupleurum	1	3	4	55. Orogenia	2	.....	2
16. Carum	4	1	5	56. Oxypolis	5	.....	5
17. Caucalis	1	1	2	57. Pastinaca	.....	1	1
18. Centella	1	.....	1	58. Petroselinum	.....	1	1
19. Chaerophyllum	3	2	5	59. Phellopterus	5	.....	5
20. Cicuta	8	.....	8	60. Pimpinella	.....	2	2
21. Coelopleurum	4	.....	4	61. Podistera	1	.....	1
22. Conioselinum	5	.....	5	62. Polytaenia	1	.....	1
23. Conium	.....	1	1	63. Pseudocymopterus	4	.....	4
24. Coriandrum	.....	1	1	64. Pteryxia	7	.....	7
25. Cuminum	.....	1	1	65. Ptilimnium	3	.....	3
26. Cymopterus	7	.....	7	66. Rhysopterus	3	.....	3
27. Cynomarathrum	7	.....	7	67. Sanicula	18	.....	18
28. Cynosciadium	3	.....	3	68. Scandix	.....	1	1
29. Daucus	1	1	2	69. Sium	3	.....	3
30. Deringa	1	.....	1	70. Spermolepis	2	.....	2
31. Deweya	1	.....	1	71. Sphenosciadium	2	.....	2
32. Drudeophytum	6	.....	6	72. Taenidia	1	.....	1
33. Erigenia	1	.....	1	73. Taeniopleurum	1	.....	1
34. Eryngium	29	4	33	74. Thaspium	3	.....	3
35. Eulophus	6	.....	6	75. Torilis	.....	2	2
36. Euryptera	6	.....	6	76. Trepocarpus	1	.....	1
37. Eurytaenia	1	.....	1	77. Washingtonia	12	.....	12
38. Foeniculum	.....	1	1	78. Zizia	3	.....	3
39. Glehnia	1	.....	1				
40. Harbouria	1	.....	1	Total	332	39	371

Thirty of the generic names found in the last table do not appear in the first. Of these 7 are the names of introduced genera, 7 have replaced later names, 1 has replaced a homonym, 7 are segregates, and 8 are new since the publication of the Revision.

GENERA NOT GIVEN IN THE REVISION.

[1] Anethum L.
Aulospermum C. & R. = Cymopterus in part.
Centella L. = Hydrocotyle in part.
Cynomarathrum Nutt. = Peucadanum in part.
[1] Cuminum L.
Deringa Adans. = Cryptotaenia DC.
Deweya T. & G. = Velaea arguta.
Drudeophytum C. & R. = Velaea in part.
Euryptera Nutt. = Peucedanum in part.
Glehnia F. Schmidt = Phellopterus Benth.
Hesperogenia C. & R.
[1] Imperatoria L.
Leibergia C. & R.
[1] Levisticum Koch.
Lilaeopsis Greene = Crantzia Nutt.
Lomatium Raf. = Peucedanum of all American authors.
Musineon Raf. = Musenium Nutt.
Oxypolis Raf. = Tiedemannia DC.
[1] Petroselinum Hoffm.
Phellopterus Nutt. = Cymopterus in part.
Pteryxia Nutt. = Cymopterus in part.
Ptilimnium Raf. = Leptocaulis Nutt.
Rhysopterus C. & R. = Cymopterus in part.
[1] Scandix L.
Spermolepis Raf. = Discopleura DC.
Sphenosciadium Gray = Selinum capillaceum B. & H.
Taenidia Drude = Pimpinella integerrima B. & H.
Taenioplenrum C. & R. = Carum howellii C. & R.
[1] Torilis Adans.
Washingtonia Raf. = Osmorhiza Raf.

The following generic names used in the Revision disappear. Two genera, *Coloptera* C. & R. and *Phellopterus* Benth., become synonyms; *Crantzia* is a homonym; *Peucedanum* L., *Selinum* L., and *Velaea* DC. are excluded from our flora; the other genera give place to earlier names.

GENERIC NAMES WHICH DISAPPEAR.

Coloptera C. & R. = Cymopterus Raf.
Crantzia Nutt. = Lilaeopsis Greene.
Cryptotaenia DC = Deringa Adans.
Discopleura DC. = Spermolepis Raf.
Leptocaulis Nutt. = Ptilimnium Raf.

[1] Introduced genera.

Musenium Nutt. = Musineon Raf.
Osmorhiza Raf. = Washingtonia Raf.
Peucedanum L. = excluded.
Phellopterus Benth. = Glehnia F. Schmidt.
Selinum L. = excluded.
Tiedemannia DC. = Oxypolis Raf.
Velaea DC. = excluded.

In the Revision the genera were arranged in a sequence which was somewhat artificial, while in the Monograph the more natural sequence of Drude is followed.

In connection with the descriptions of genera and species, only what we regard as the essential synonymy is cited, in all cases including the first use of the name. Of these references there are nearly 800, and with the exception of 5 all have been verified. In the process of this verification we have been more impressed than ever by the numerous errors which creep into unverified citations and are thus indefinitely perpetuated.

The following references have not been verified by the authors:

Anthriscus Bernh. Syst. Verz. Ery. 113. 1800.
Berula Hoffm. in Bess. Enum. Pl. Volh. 44. 1821.
[1] Bifora Hoffm. Umb. Gen. ed. 2. 191. 1816.
[1] Bupleurum protractum Hoffmgg. & Link, Fl. Port. **2**:387. 1820.
Hydrocotyle natans Cyrilli, Pl. Rar. Neap. 1:20. 1792.

The type locality is also given wherever the information is accessible, and we have thought it best to quote the original statement in reference to it, with such explanatory remarks as seem necessary to make it more definite. The collector and present location of the type specimens are also named, so far as known.

As there is at present considerable discussion regarding the manner of selecting the type species of a genus, we have given some attention to the subject. With the exception of the Linnaean genera, the results are the same whether the first species is selected as the type or the method of residues is used. In this connection the data given below are of interest. Of the 26 Linnaean genera, 3 do not at present contain the first species originally cited by Linnaeus, viz, *Apium*, *Caucalis*, and *Ligusticum*.

[1] References verified by Dr. William Trelease.

Genera published in first edition of Linnaeus's Species Plantarum, 1753.

Genus.	Number species given in Sp. Pl.	First species cited.	Present generic reference of first species.
[1] Aegopodium	1	podagraria.	
[1] Aethusa	1	cynapium.	
[1] Ammi	2	majus.	
[1] Anethum	2	graveolens.	
Angelica	4	archangelica.	
Apium	2	petroselinum	Petroselinum.
Bupleurum	13	rotundifolium.	
Carum	1	carui.	
Caucalis	6	grandiflora	Daucus.
Chaerophyllum	6	silvestre.	
Cicuta	3	virosa.	
[1] Conium	3	maculatum.	
[1] Coriandrum	2	sativum.	
[1] Cuminum	1	cyminum.	
Daucus	3	carota.	
Eryngium	8	foetidum.	
Heracleum	5	sphondylium.	
Hydrocotyle	5	vulgaris.	
[1] Imperatoria	1	ostruthium.	
Ligusticum	4	levisticum	Levisticum.
Oenanthe	5	fistulosa.	
[1] Pastinaca	2	sativa.	
[1] Pimpinella	4	saxifraga.	
Sanicula	3	europaea.	
[1] Scandix	8	odorata.	
Sium	8	latifolium.	

[1] Represented in America by introduced species only. All the other genera contain endemic species, but are based on Old World species.

Thirty-three post-Linnaean genera were based on single species, and the type is therefore easily determined. These genera, with the species upon which each was based, are shown in the following table:

Post-Linnaean genera.

Genus.	Type species.
Aletes C. & R	Deweya acaulis Torr.
Ammoselinum T. & G	A. popei T. & G.
Anthriscus Bernh	A. vulgaris Bernh.
Berula Hoffm	Sium erectum L.
Bifora Hoffm	B. dicocca Hoffm.
Coelopleurum Ledeb	Archangelica gmelini DC.
Cymopterus Raf	Selinum acaule Pursh.
Deringa Adans	Sison canadense L.
Deweya T. & G	D. arguta T. & G.
Erigenia Nutt	Sison bulbosum Michx.
Eulophus Nutt	E. americanus Nutt.
Euryptera Nutt	E. lucida Nutt.
Eurytaenia T. & G	E. texana T. & G.
Glehnia F. Schmidt	Cymopterus littoralis Gray.
Harbouria C. & R	Thaspium trachypleurum Gray.
Hesperogenia C. & R	H. stricklandi C. & R.
Leibergia C. & R	L. orygenioides C. & R.
Levisticum Koch	Ligusticum levisticum L.
Lilaeopsis Greene	Hydrocotyle lineata Michx.
Lomatium Raf	L. villosum Raf.
Museniopsis C. & R	Tauschia texana Gray.
Musineon Raf	Seseli divaricatum Pursh.
Oreoxis Raf	O. humilis Raf.
Orogenia Watson	O. linearifolia Watson.
Petroselinum Hoffm	Apium petroselinum L.
Podistera Watson	Cymopterus nevadensis Gray.
Polytaenia DC	P. nuttallii DC.
Ptilimnium Raf	Ammi capillaceum Michx.
Spermolepis Raf	Daucus divaricatus Walt.
Taenioplenrum C. & R	Carum howellii C. & R.
Taenidia Drude	Smyrnium integerrimum L.
Sphenosciadium Gray	S. capitellatum Gray.
Washingtonia Raf	Myrrhis claytoni Michx.
Zizia Koch	Zizia aurea Koch.

The four following are pre-Linnaean genera not recognized by Linnaeus, but afterwards restored as indicated:

Torilis Adanson, Fam. **2**: 99. 1763. No species cited.

Foeniculum Adanson, Fam. **2**: 101. 1763. =Anethum foeniculum L.

Levisticum Koch, Nov. Act. Caes. Leop. Acad. **12**: 101. 1824. =Ligusticum levisticum L.

Petroselinum Hoff. Gen. Umb. 78. 1814. =Apium petroselinum L.

In only twelve of the post-Linnaean genera, including the three genera here published for the first time, were there more than one species included in the original description. In some of these genera the type is indicated, while in the other cases we have cited the first species. These genera, with the number of original species, and with the type species or first species cited, are given in the following table:

Post-Linnaean genera.

Genus.	Number species.	Type, or first species cited.
Apinstrum Nutt.	2	A. angustifolium Nutt.
Aulospermum C. & R.		Cymopterus longipes Watson.
Cynosciadium DC.	2	C. digitatum DC.
Drudeophytum C. & R.		Deweyia hartwegi Gray.
Leptotaenia Nutt.	3	L. dissecta Nutt.
Oxypolis Raf.	5	Sium rigidius L.
Phellopterus Nutt.	2	P. montanus Nutt.
Pseudocymopterus C. & R.	3	Thaspium(?) montanum Gray.
Pteryxia Nutt.	4	Selinum terebinthinum Hook.
Rhysopterus C. & R.	3	R. plurijugus C. & R.
Thaspium Nutt.	5	T. aureum Nutt.
Trepocarpus Nutt.	2	T. aethusae Nutt.

The four following genera were established without specific types:

Torilis and Foeniculum, pre-Linnaean genera, were restored by Adanson in 1863.

Conioselinum, described by Hoffman in 1814, was redescribed in 1816, with *C. tartaricum* as the type.

Bowlesia was described by Ruiz and Pavon in 1794, but with an unnamed plate of *B. palmata*, which was named a few years afterwards.

We have given the general geographical range, and such important specimens as have been studied in preparing this monograph are cited. It should be remembered, however, that the range given is often the reported range, while the range as we know it is shown by the specimens cited. It will be noticed that a great many specimens cited in the Revision are not included among those cited in the Monograph, so that the latter work represents a great extension of the horizon so far as it can be furnished by material.

It has been thought wise to assist in the recognition of genera by including in the text illustrations of characteristic fruits, showing both surface and cross section. Every genus containing native species is illustrated either by a plate or by at least two text cuts. A few of the figures have been published before, but for the most part the drawings have been prepared by Miss Anna Synder, under the direction of J. N. Rose. The drawings for the plates were made by Mr. Frederick A. Walpole.

We have also attempted to separate with great distinctness the native genera and species from the introduced ones. Accordingly, the latter are grouped together at the end of the Monograph, but are included in the general keys.

It is a matter of regret that no adequate presentation of the family from the ecological standpoint seems to be possible as yet. The general facts of the geographical distribution have long been known, and need not be repeated here: but the wide range of conditions, the great variability of numerous forms, the indefiniteness of many of the recognized genera, all assure us that it is a group in which a study of the relation between forms and conditions would be very profitable.

This work has been based chiefly upon the collection in the National Herbarium, formerly deposited at the Department of Agriculture, now under the care of the U. S. National Museum. Here are to be found all the types of new species described in this work, as well as the first set of all the Government surveys for the last fifty years. This collection contains about 9,000 sheets of Umbelliferae, and has undoubtedly the richest representation of North American Umbelliferae in the world.

The work has been supplemented by an examination of the Coulter herbarium, now in the University of Chicago, which contains nearly all of the types of our Revision. Every specimen has been examined in the Philadelphia Academy of Science, the New York Botanical Garden, the Gray herbarium at Cambridge, Frank Tweedy's herbarium (Washington), a part of Professor Greene's herbarium (Catholic University, Washington), a part of Mr. Thomas H. Kearney's collection (rich in southern species); also certain types from the M. E. Jones herbarium, from the California Academy of Science, and from the University of California, as well as from numerous collectors. The Canby herbarium, now in the College of Pharmacy, New York City, was placed at our disposal by Dr. H. H. Rusby. The entire collection of Walter Deane's herbarium has passed through our hands, and although it is confined to the range of Gray's Manual it contains many interesting plants, all of which are mounted in the most perfect manner.

Among those who have assisted us should be mentioned the following: Mr. Frederick V. Coville, who greatly interested himself in the publication of this report and offered many valuable suggestions; Prof. E. L. Greene, who placed his herbarium and choice library at our disposal and gave help in knotty questions of nomenclature; Dr. B. L. Robinson, Dr. N. L. Britton, and Mr. Thomas Meehan, who not only loaned material from the great herbaria which they control, but extended many courtesies while at work in their separate institutions; Dr. W. L. Jepson, who loaned or sent material from his private collection and from the University of California; Miss Alice Eastwood, who loaned specimens of Hydrocotyle from the California Academy of Science; Prof. Harry Garman, who sent material from Kentucky, and Mr. George E. Osterhout, from Colorado; Messrs. C. V. Piper and L. F. Henderson, who sent material from the Northwest, accompanied by many valuable notes and suggestions; and Mr. J. W. Blankinship, who sent material from Montana. Mr. W. Botting Hemsley and Mr. H. Harold W. Pearson have looked up types at Kew; while Mr. E. G. Baker of the British Museum has given assistance in comparing our material with types in London.

As more or less confusion sometimes occurs through failure to cite the specimens from which a drawing is made, we give the following data concerning the collections used in making the original drawings, the order being that of the generic sequence. The specimens are all to be found in the U. S. National Herbarium:

Data concerning specimens shown in text figures.

Name of species.	Locality.	Collector.	Number.	Date.
Hydrocotyle cuneata	Montezuma well, Arizona.	MacDougal	575	August 7, 1891.
Centella asiatica	Florida	Chapman	1004c	June.
Bowlesia septentrionalis	Tucson, Ariz	M. Zuck		May 16, 1896.
Sanicula trifoliata	New York	Bicknell		September 22, 1895
Chaerophyllum tainturieri dasycarpum.	Texas	Jermy	141	
Washingtonia brachypoda	California	Parish	3479	June 29, 1894.
Cancalis microcarpa	Idaho	Sandberg	328	June 6, 1892.
Bifora americana	Texas	Heller	1656	May 14–21, 1894.
Apiastrum patens	Indian Territory	Bush	187	June 21, 1894.
Erigenia bulbosa	District of Columbia	Vasey		1881.
Orogenia linearifolia	Washington	Suksdorf		May 17, 1882.
Musineon tenuifolium	Nebraska	Rydberg	127	July 4, 1891.
Deweya arguta	California	Parish	4470	June 26, 1897.
Drudeophytum hartwegi	California	Mrs. Austin	866	June, 1896.
Museniopsis texana	Texas	Wurzlow		May, 1895.
Bupleurum americanum	Wyoming	Rose	341	September 6, 1893.
Trepocarpus aethusae	Indian Territory	Sheldon	101	July 6, 1891.
Apium ammi	Texas	Havard		May, 1883.
Spermolepis divaricata	New Mexico	Dewey		June, 1891.
Ammoselinum popei	Texas	Havard		May, 1883.
Zizia cordata	Pennsylvania	Porter		September 25, 1891.
Harbouria trachypleura	Colorado	Osterhout		July, 1895.
Cicuta maculata	Kansas	Crevecœur	24	1892.
Deringa canadensis	Minnesota	Mearns		August 31, 1891.
Taenioplecurum howelli	Oregon	Howell		
Carum oreganum	Oregon	Coville & Leiberg	254	August 6, 1896.
Aletes acaulis	Colorado	Patterson	37	July 1, September 9, 1895.
Taenidia integerrima	Michigan	Davis		August 28, 1891.
Eulophus americanus	Illinois	Hall		July, 1861.
Sium cicutaefolium	South Dakota	Thornber		August 25, 1893.
Berula erecta	Wyoming	A. Nelson	2766	August 27, 1896.
Ptilimnium capillaceum	Florida	Nash	1930	May 28, June 15 1895.
Cynosciadium pinnatum	Texas	Nealley	157	1890.
Oenanthe sarmentosa var	California	Jepson		June 19, 1897.
Podistera nevadensis	California	Lemmon		1898.
Eurytaenia texana	Texas	Nealley		1888.
Sphenosciadium capitellatum	California	Hansen	324	August 23, 1893.
Ligusticum canadense	North Carolina	Merriam		September 9, 1892.
Coelopleurum longipes	Oregon	Howell	735	July 28, 1891.
Oreoxis humilis	Colorado	Canby		August 27, 1895.
Oreoxis bakeri	Colorado	Baker	577	July 14, 1898.
Thaspium trifoliatum	Tennessee	Kearney	704	September 7, 1897.
Coniosclinum gmelini	Washington	Piper	631	July 23, 1890.
Glehnia littoralis	Oregon	Howell		July 14, 1882.
Phellopterus montanus	Colorado	Bethel		June 25, 1898.
Pteryxia terebinthina	Washington	Suksdorf		June 3–July, 1883.
Aulospermum longipes	Utah	Jones		May 24, 1895.
Cymopterus parryi	Wyoming	Jones		June 24, 1896.
Rhysopterus plurijugus	Oregon	Leiberg	2240	
Pseudocymopterus montanus	Colorado	Bethel	3618	August, 1895.
Polytaenia nuttallii	Illinois	Hall		June, 1868.
Oxypolis rigidior	Maryland	Pollard	752	October 6, 1895.
Leptotaenia multifida	Nevada	Jones		May 20, 1893.
Lomatium nevadense	Oregon	Leiberg	361	June 30, 1894.
Euryptera howellii	Oregon	Howell		July 7, 1887.
Euryptera lucida				
Cynomarathrum lapidosum	Wyoming	Jones		
Cynomarathrum eastwoodae	Colorado	Miss Eastwood		May, 1892.
Heracleum lanatum	Oregon	Sheldon	8148	1897.
Daucus pusillus	Arizona	M. Zuck		May 16, 1896.

The following illustrations are reproduced, a part having been used in this series (Contr. Nat. Herb.), while the others have been placed in our hands by the editors of the Botanical Gazette, the editor of the Proceedings of the Washington Academy of Sciences, and the

director of the Kew Gardens. The place and year of publication of each are given below:

Angelica roseana, Contr. Nat. Herb. **5**: pl. 24. 1899.
Drudeophytum glaucum, Contr. Nat. Herb. **3**: pl. 14. 1895.
Eryngium sparganophyllum, Hook. Ic. pl. 2508. 1897. Also Proc. Wash. Acad. **1**: fig. 4. 1900.
Hesperogenia stricklandi, Contr. Nat. Herb. **5**: pl. 27. 1899.
Leibergia orogenioides, Contr. Nat. Herb. **3**: pl. 27. 1896.
Ligusticum leibergi, Contr. Nat. Herb. **3**: pl. 12. 1895.
Ligusticum eastwoodae, Contr. Nat. Herb. **3**: pl. 13. 1895.
Lilaeopsis carolinensis, Bot. Gaz. **24**: 49. fig. 4. 1897.
Lilaeopsis lineata, Bot. Gaz. **24**: 47. fig. 1. 1897.
Lilaeopsis occidentalis, Bot. Gaz. **24**: 48. fig. 2. 1897.
Lilaeopsis schaffneriana, Bot. Gaz. **24**: 48. fig. 3. 1897.

ARTIFICIAL KEY TO THE GENERA OF NORTH AMERICAN UMBELLIFERAE.

Only the most prominent features of each genus are included and exceptional species may be omitted. The native genera are printed in **bold-face** type; the introduced genera in *italics*. The appended numbers refer to the pages upon which the genera are fully described.

Flowers in dense heads ..... **Eryngium**, 42.
Flowers not in heads, evidently umbellate.
  Fruit conspicuously bristly.
    Fruit covered with spines or hooked bristles.
      Fruit with strong spines ..... *Torilis*, 251.
      Fruit with hooked bristles.
        Leaves palmately divided, with broad segments ..... **Sanicula**, 32.
        Leaves ternately dissected, with filiform segments ..... **Spermolepis**, 87.
    Fruit with bristles only on the ribs.
      Bristles barbed at tip; stylopodium obsolete ..... **Daucus**, 249.
      Bristles not barbed; stylopodium conical ..... **Caucalis**, 69.
  Fruit not bristly (except *Washingtonia* and *Cuminum*).
    OIL TUBES OBSOLETE OR OBSCURE.
      Fruit strongly flattened laterally.
        Fruit with secondary ribs and reticulations; involucre conspicuous. **Centella**, 29.
        Fruit without secondary ribs or reticulations; involucre wanting. **Hydrocotyle**, 25.
      Fruit not strongly flattened.
        Seed face concave.
          Stylopodium conical.
            Fruit usually bristly ..... **Washingtonia**, 60.
            Fruit smooth.
              Fruit linear oblong.
                Fruit without ribs ..... *Anthriscus*, 251.
                Fruit ribbed ..... *Scandix*, 251.
              Fruit of nearly distinct globose carpels ..... **Bifora**, 70.
          Stylopodium flat or wanting.
            Leaves simple and perfoliate ..... **Bupleurum**, 84.
            Leaves large and decompound ..... *Conium*, 252.
        Seed face plane.
          Leaves simple and lobed; southwestern ..... **Bowlesia**, 30.
          Leaves biternate; introduced at the east ..... *Aegopodium*, 254.

OIL TUBES DISTINCT.

FRUIT STRONGLY FLATTENED DORSALLY, with lateral ribs more or less prominently winged.

Oil tubes solitary in the intervals.

Stylopodium conical.

Slender and glabrous.....**Oxypolis,** 192.

Stout and pubescent, at least in the umbel.

Leaves once or twice pinnate.....**Sphenosciadium,** 127.

Leaves large and ternately compound.....**Heracleum,** 248.

Stylopodium flat or wanting.

Caulescent and branching.

Flowers white.

Slender; leaves pinnately dissected; dorsal ribs filiform.

Lateral wings thick and prominent; Texan....**Eurytaenia,** 126.

Lateral wings narrow; introduced.....*Anethum*, 255.

Stout, leaves ternately or pinnately compound; dorsal ribs prominent.....**Angelica,** 153.

Flowers yellow.

Dorsal ribs prominent.....*Levisticum*, 255.

Dorsal ribs filiform.....*Pastinaca*, 255.

Acaulescent, or nearly so.

Stylopodium wanting; calyx teeth minute or obsolete; dorsal ribs filiform.

Leaves ternate to dissected, with narrow or small leaflets.

Lomatium, 204.

Leaves once or twice compound, with broad and sharply toothed leaflets.....**Euryptera,** 240.

Stylopodium flat but evident; calyx teeth evident; dorsal ribs sharp or winged.....**Cynomarathrum,** 244.

Oil tubes more than one in the intervals.

Caulescent and branching.

Dorsal ribs obsolete; laterals corky-thickened; flowers yellow.

Polytaenia, 191.

Dorsal ribs prominent; laterals not corky-thickened; flowers white.

Leaves ternately or pinnately compound.

Leaves once ternate, with broad, stalked segments.

Imperatoria, 255.

Leaves more than once ternate or pinnate.....**Angelica,** 153.

Leaves much more compounded.....**Conioselinum,** 149.

Acaulescent or nearly so.

Lateral wings thin.

Stylopodium wanting; calyx teeth minute or obsolete; dorsal ribs filiform.

Leaves ternate to dissected, with narrow or small leaflets.

Lomatium, 204.

Leaves once or twice compound, with broad and sharply toothed leaflets.....**Euryptera,** 240.

Stylopodium flat but evident; calyx teeth evident; dorsal ribs sharp or winged.....**Cynomarathrum,** 244.

Lateral wings thick.

Dorsal ribs very prominent or slightly winged.

Pseudocymopterus, 187.

Dorsal ribs filiform.

Dwarf, with small pinnate or lobed leaves.....**Cymopterus,** 179.

Tall and stout, with large pinnately decompound leaves.

Leptotaenia, 196.

FRUIT NOT STRONGLY FLATTENED DORSALLY, usually more or less laterally flattened.

Oil tubes solitary in the intervals.

Stylopodium conical.

Leaflets (at least the upper) linear to filiform.

Involucre wanting; introduced.

Flowers white ..... *Coriandrum*, 252.

Flowers yellow ..... *Foeniculum*, 254.

Involucre present; flowers white (except *Cuminum*).

Low and diffuse, with ternately divided leaves.

Ammoselinum, 88.

Taller and erect.

Leaves finely dissected.

Fruit ovate.

Fruit smooth ..... **Ptilimnium**, 117.

Fruit bristly or tuberculate ..... **Spermolepis**, 87.

Fruit linear-oblong.

Fruit smooth; flowers white ..... **Trepocarpus**, 85.

Fruit bristly; flowers rose color ..... *Cuminum*, 253.

Leaves with few leaflets.

Lateral ribs thick and corky; southern ... **Cynosciadium**, 120.

Ribs all filiform; western ..... **Carum**, 103.

Leaflets broader.

Seed face concave ..... **Chaerophyllum**, 58.

Seed face plane.

Fruit oblong to orbicular.

Involucre of few bracts or none ..... **Cicuta**, 93.

Involucre conspicuous ..... **Taeniopleurum**, 102.

Fruit linear-oblong ..... **Deringa**, 101.

Stylopodium flat or wanting.

Flowers white.

Ribs thick and corky, at least the laterals.

Dorsal ribs filiform; aquatic.

Leaves reduced to hollow petioles ..... **Lilaeopsis**, 123.

Leaves pinnate or decompound ..... **Oenanthe**, 121.

All the ribs prominent and corky.

Ribs wing-like and much wrinkled when young.

Rhysopterus, 185.

Ribs broad and not wrinkled.

Fruit small (not more than 2 mm. long), flattened laterally.

Involucre wanting ..... **Apium**, 86.

Involucre present ..... *Ammi*, 253.

Fruit larger, ovoid-globose ..... *Aethusa*, 254.

Ribs filiform or obsolete.

Ribs filiform ..... **Leibergia**, 108.

Ribs obscure or obsolete ..... **Apiastrum**, 71.

Flowers yellow.

Ribs equal, broad, and corky.

Low and cespitose; high alpine ..... **Oreoxis**, 143.

A foot or more high; in the foothills or low ground.

Fruits tuberculate-roughened; calyx teeth evident.

Harbouria, 92.

Fruit smooth; calyx teeth obsolete ..... *Petroselinum*, 253.

Ribs winged or filiform.

Ribs conspicuously winged ..... **Thaspium,** 145.
Ribs filiform.
Tall and branching, with broad leaflets ..... **Zizia,** 90.
Acaulescent and cespitose ..... **Aletes,** 106.

Oil tubes more than one in the intervals.

Stylopodium conical.
Fruit round, with globose carpels and very slender inconspicuous ribs. **Berula,** 116.
Fruit ovate to oblong.
Fruit with prominent equal ribs ..... **Ligusticum,** 129.
Fruit with filiform or almost obsolete ribs.
Involucre usually present; ribs equal and filiform .. **Eulophus,** 110.
Involucre usually wanting; ribs almost obsolete .... *Pimpinella,* 254.

Stylopodium flat or wanting.
Seed face sulcate or decidedly concave.
Carpels flattened dorsally.
Ribs filiform ..... **Musineon,** 76.
Ribs with broad, thin wings ..... **Aulospermum,** 174.
Carpels terete or flattened laterally.
Carpels terete.
Seed face involute, inclosing a central cavity. **Drudeophytum,** 80.
Seed face with a deep sulcus.
Ribs filiform; calyx teeth obsolete ..... **Museniopsis,** 83.
Ribs prominent and very acute; calyx teeth prominent. **Deweya,** 79.
Carpels strongly flattened laterally ..... **Erigenia,** 73.
Seed face plane, or but slightly concave.
All the ribs conspicuously winged.
Wings corky-thickened; tomentose seashore plants .. **Glehnia,** 165.
Wings thin; plants of the mountains and plains.
Leaves pinnate, with short, crowded, and more or less confluent segments; flowers usually purple ..... **Phellopterus,** 166.
Leaves ternate-pinnate, with short linear and more or less pungent segments; flowers usually yellow ..... **Pteryxia,** 170.
Ribs not winged.
All the ribs filiform.
Acaulescent, mountain plants.
Flowers yellow; calyx teeth obsolete ..... **Hesperogenia,** 75.
Flowers white or pinkish; calyx teeth prominent. **Podistera,** 125.
Caulescent, low-ground plants ..... **Taenidia,** 109.
Ribs corky, at least the laterals.
Lateral ribs thick and corky, the dorsals filiform .. **Orogenia,** 74.
All the ribs corky and equally prominent.
Fruit not flattened either way ..... **Coelopleurum,** 140.
Fruit flattened laterally.
Oil tubes continuous about seed cavity ..... **Bupleurum,** 84.
Oil tubes one to three in the intervals ..... **Sium,** 114.

NATIVE GENERA AND SPECIES.

1. HYDROCOTYLE L. Sp. Pl. 1: 234. 1753.

Calyx teeth minute or obsolete. Fruit more or less orbicular, strongly flattened laterally. Carpel with five primary ribs, the dorsal marginal, broad or filiform; intermediates filiform (rarely obsolete), usually curved; laterals filiform or broad, distinct from those of the other carpel or confluent; a prominent oil-bearing layer beneath the epidermis, occasionally containing small oil tubes, and usually a thick layer of strengthening cells surrounding the seed cavity.

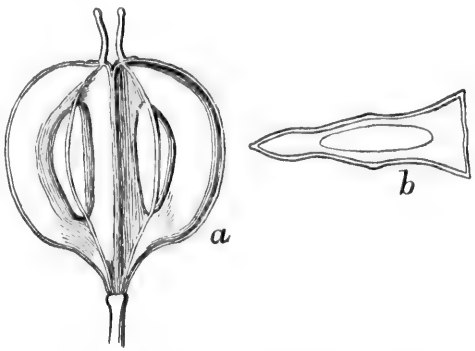


FIG. 1.—Hydrocotyle cuneata: *a*, × 10; *b*, × 20.

Low herbaceous perennials growing in or near water, with slender creeping stems, orbicular-peltate or reniform leaves, and small white flowers in simple or proliferous umbels without involucre.

First species cited, *H. vulgaris* L.

A genus widely distributed in both hemispheres, containing about 75 species, 9 of which are found in the United States and Canada.

Fruit with pericarp thin except at the broad thick corky dorsal and lateral ribs; involucre of short ovate bracts; leaves orbicular-peltate, crenate; peduncles as long as petioles, both from slender creeping rootstocks.
- Fruit notched at base and apex.
  - Umbels simple ..... 1. *H. umbellata.*
  - Umbels proliferous.
    - Umbels few.
      - Dorsal ribs very obtuse; California ..... 2. *H. prolifera.*
      - Dorsal ribs rather acute; Atlantic coast ..... 3. *H. canbyi.*
    - Umbels numerous in a profusely branching inflorescence ... 4. *H. bonariensis.*
- Fruit not notched.
  - Fruit not cuneate at base.
    - Fruit subsessile ..... 5. *H. verticillata.*
    - Fruit pedicellate ..... 6. *H. australis.*
  - Fruit cuneate at base ..... 7. *H. cuneata.*

Fruit with pericarp uniformly corky-thickened and ribs all filiform; leaves not peltate; peduncles much shorter than petioles.
- Leaves thin, with short petioles; umbels subsessile ..... 8. *H. americana.*
- Leaves thicker, with elongated petioles; umbels peduncled .. 9. *H. ranunculoides.*

1. Hydrocotyle umbellata L. Sp. Pl. 1: 234. 1753.

H. umbellulata Michx. Fl. Bor. Am. 1: 161. 1803.

Descending branches of the rootstock with round tubers; umbels many-flowered, simple (rarely slightly proliferous); pedicels 4 to 12

mm. long; fruit strongly notched, 2 mm. long, about 3 mm. broad, with dorsal ribs prominent but obtuse.

Type locality, "in America."

In the Atlantic States from Massachusetts to Florida, and westward to Minnesota and Texas; also in southern California and extending into Mexico.

Specimens examined:

MASSACHUSETTS: No Man's Land, *L. F. Ward*, August 10, 1889.

NEW YORK: Wading River, Long Island, *E. S. Miller*, August 12, 1873; river banks near Oswego, *C. S. Sheldon*, August 6, 1880.

MARYLAND: Ocean City, *Canby*, August, 1874.

INDIANA: Long Lake, near Lake Michigan, *Umbach*, September 18, 1897.

VIRGINIA: Near Ocean View Hotel, *Coville* 30, June 22, 1890.

NORTH CAROLINA: Ponds and ditches near Wrightsville, *Biltmore Herb.* 4005, July 1, 1897.

FLORIDA: Near Jacksonville, *Curtiss* 991, 4334, 4692, 5676; near Apalachicola, *Biltmore Herb.* 4005*b*, May, 1887; near Eustis, Lake County, *Nash* 351, April 1–15, 1894; Tampa, *C. L. Pollard*, March 7, 1898.

MISSISSIPPI: Petit Bois Island, Biloxi, and Ship Island, *Tracy*, May, 1898.

CALIFORNIA: Near San Bernardino, *Parish Bros.* 920, May, 1882; near Colton, *Jones* 3192, April 28, 1882; same station, *Dunn*, July, 1888; Big Morongo, eastern base of San Bernardino Mountains, *S. B. Parish* 3192, June 15, 1894; near San Jacinto, *Leiberg* 3103, March 8, 1898.

We have excluded numerous forms, including many proliferous ones, which have been included under this species.

2. **Hydrocotyle prolifera** Kellogg, Bot. Calif. **1**: 254. 1876.

Tuberous as in *H. umbellata;* umbels proliferous, with 3 to 5 whorls, each containing 5 to 20 flowers; pedicels 2 to 6 mm. long; fruit slightly notched, 2 mm. long, somewhat broader, with dorsal ribs prominent and more obtuse than in *H. umbellata.*

Type locality, marshes "about San Francisco;" collected by *Kellogg* in 1854; type in Herb. Calif. Acad.

In the region about San Francisco, Cal., and said to occur in Texas and Mexico; possibly also represented in Arizona by the form referred to below.

Specimens examined:

CALIFORNIA: Mission Bridge, San Francisco, *Kellogg;* San Francisco, *G. R. Vasey* 221, July, 1880; Elk Grove, Lower Sacramento, *Drew*, in 1888; San Francisco, *Brandegee*, July, 1891; Bouldin Island, San Joaquin River, *Brandegee*, September 7, 1892.

Numerous Californian specimens have been referred to this species, which seem to belong more properly either to *H. umbellata* or *H. cuneata.* Specimens from wet land on the shore of Silver Lake, near Tucson, Ariz. (*Pringle* in 1881 and *Dewey* in 1891), seem to represent a form of this species, in which the axis of inflorescence is elongated, the whorls being distant and few-flowered, and the pedicels are longer than we have seen in Californian specimens. We have not been able to confirm the statement that the species occurs in Texas and Mexico.

3. **Hydrocotyle canbyi** C. & R. Bot. Gaz. **12**: 103. 1887.

H. umbellata ambigua Gray, Man. ed. 5. 190. 1867, not *H. ambigua* Pursh.
H. ambigua B. S. P. Prel. Cat. N. Y. 21. 1888.

Umbels 3 to 9-flowered, generally proliferous; pedicels very short, but distinct; fruit slightly notched, 2 mm. long and about 4 mm. broad, much more flattened than in the preceding forms; dorsal and lateral ribs much more prominent, the former acutish.

Type locality, "Maryland;" type in Herb. Gray.

New Jersey to Maryland.

Specimens examined:

DELAWARE: Collins Beach, *Commons*, July 6, 1874.

MARYLAND: Ocean City, *Canby*, August, 1874.

4. **Hydrocotyle bonariensis** Lam. Encycl. **3**: 153. 1789.

H. bonariensis texana C. & R. Bot. Gaz. **15**: 259. 1890.

Umbels profusely branching and proliferous; pedicels slender, more or less elongated, sometimes 2 cm. long; fruit slightly notched, 2 mm. long, 3 mm. broad.

Type locality, "pres de Buenos-Ayres."

From North Carolina to Florida and Texas; a South American and Mexican species, and often a ballast plant.

Specimens examined:

NORTH CAROLINA: Ballast dumps at Wilmington, *Biltmore Herb.* 5708, July 2, 1897.

FLORIDA: Dry grassy ground, Pensacola, *Curtiss* 5922, July 3, 1897.

MISSISSIPPI: Biloxi, Harrison County, *Pollard* 1153, August 1, 1896.

TEXAS: *Lindheimer*, October, 1847 (under *H. umbellata*); Devils River, *Havard* 139, July, 1883; *Nealley*, in 1888; Industry, *Wurzlow*, in 1895.

Most of the so-called proliferous forms of *H. umbellata* throughout the South and Southwest and on ballast heaps seem to belong to *H. bonariensis*.

5. **Hydrocotyle verticillata** Thunberg, Diss. **2**: 415. pl. 3. 1800.

H. interrupta Muhl. Cat. 29. 1813.

Umbels few-flowered, proliferous, forming an interrupted spike; pedicels very short or none; fruit 2 mm. long, 3 mm. broad, truncate or rounded at base, with dorsal and lateral ribs very prominent, the former acute.

Type locality unknown.

From Massachusetts to Florida, west to central Texas and Arkansas.

Specimens examined:

NEW JERSEY: Cape May, *Canby*, July, 1866.

VIRGINIA: Hampton, *Steele*, August, 1895.

NORTH CAROLINA: Near Clarkton, *Biltmore Herb.* 2542*a*, June 25, 1897.

SOUTH CAROLINA: Near Aiken, *Ravenel*.

FLORIDA: Hibernia, *Canby*, March, 1869; St. Johns River above Palatka, *Curtiss* 992; *Otto Vesterlund*, in 1889; near Jacksonville, *Curtiss* 4333, 4963, May 30, 1893, and June 29, 1894; Palm Beach, *Canby*, March 29, 1895; Lake City, Columbia County, *Nash* 2485, August 29–31, 1895.

MISSISSIPPI: Biloxi, *Tracy* 4471, May 26, 1898.

TEXAS: Hempstead, *Hall* 239, May 28, 1872; Houston, *L. F. Ward*, September 12, 1877; Gillespie County, *Jermy;* Dove Creek, Tom Green County, *Tweedy* 190, May, 1880; Concho, *Havard*, June, 1881.

ARKANSAS: Spirit Lake, Lafayette County, *A. A. & E. Gertrude Heller* 4113, August 18, 1898.

6. **Hydrocotyle australis** C. & R., sp. nov.

H. canbyi Britton & Brown, Ill. Fl. **2**: 540. 1897, as to habit sketch, not as to description.

Umbels few-flowered, proliferous, with 3 to 6 verticils, sometimes slightly branched; pedicels 2 to 4 mm. long; fruit 2 mm. long, slightly broader, rounded at base.

Type locality, shore of Lake Worth, Florida; collected by *Curtiss*, no. 5376, in 1895; type in U. S. Nat. Herb.

Virginia (Dismal Swamp), Florida, Texas.

Specimens examined:

VIRGINIA: Dismal Swamp, *Pollard* 871, May 30, June, 1896.

FLORIDA: *Chapman;* near Jacksonville, *Curtiss* 992, 4964; shore of Lake Worth, *Curtiss* 5378, May 8, 1895.

MISSISSIPPI: Horn Island, *Tracy* 4443, June 1, 1898.

TEXAS: Del Rio, *Nealley* 244, September, 1890; river near San Antonio, *Dewey*, June 11, 1891; near Kerrville, Kerr County, *Heller* 1935, June 26–30, 1894.

7. **Hydrocotyle cuneata** C. & R., sp. nov. FIG. 1.

Umbels few-flowered, proliferous, sometimes slightly branching; pedicels very short; fruit 2 mm. long, 3 to 4 mm. broad, tapering to the pedicel by a very distinct cuneate base.

Type locality, Montezuma Well, Arizona; collected by *D. T. MacDougal*, no. 575, in 1891; type in U. S. Nat. Herb.

Western Texas to southern California and extending northward to the region about San Francisco.

Specimens examined:

TEXAS: New Braunfels, *Lindheimer* 1, June, 1847.

NEW MEXICO: *Wright* 1383.

ARIZONA: *Palmer*, in 1869; Sanoita Valley Springs, *Lemmon* 2710, June, 1882; Montezuma well, *MacDougal* 575, August 7, 1891; Catalpa, *MacDougal*, September, 1891.

CALIFORNIA: Suisun Marsh, Solano County, *Greene*, in 1883; San Luis Obispo, *Lemmon* 57, June, 1887; Colorado Desert, San Diego County, *Orcutt*, April, 1889; Santa Barbara, *Mrs. Bingham;* Sonoma Creek, *Mrs. Hutchings*, August, 1898.

8. **Hydrocotyle americana** L. Sp. Pl. **1**: 234. 1753.

Stems filiform, branching and creeping, often bearing small fusiform tubers; leaves thin, round reniform, crenate-lobed and lobes crenate, shining; few-flowered umbels axillary and almost sessile; fruit about 1 mm. broad, with evident ribs and no oil-bearing layer; seed section broadly oval.

Type locality, "septentrionalis America;" collected by *Kalm*.

From northeastern Canada to Minnesota and south to the mountains of North Carolina.

Specimens examined:

CANADA: Bass River, New Brunswick, *Fowler*, August 9, 1875.

MAINE: Foxcroft, valley of Piscataquis River, *Fernald* 320, July 23, 1895.

MASSACHUSETTS: Amherst, *Mrs. A. F. Stevens*, July 2, 1895.

CONNECTICUT: Greens Farms, *Pollard* 224, August 7, 1894; Fairfield and Mitford, *Eames*, in 1894 and 1895.

RHODE ISLAND: Providence, *W. W. Bailey*, in 1874.
NEW JERSEY: Fort Lee, *Van Sickle*, July 12, 1894.
DISTRICT OF COLUMBIA: Near Washington, *Vasey*, September 20, 1885; near Takoma, *Pollard* 471, July 10, 1895.
NORTH CAROLINA: Buncombe County, *Biltmore Herb.* 4003*a*, June 27, 1898.
NEW YORK: Oswego County, *Sheldon*, August 13, 1883; near Ithaca, *Coville*, in 1885 and 1886; near Ithaca, *Wiegand*, July 5, 1893.
WISCONSIN: Rock Creek, *Vasey*, in 1872; St. Croix Falls, *Sheldon*, September, 1893.

9. **Hydrocotyle ranunculoides** L. f. Suppl. 177. 1781.

H. natans Cyrilli, Pl. Rar. Neap. 1: 20. pl. 605. 1892.

Floating or creeping in mud; leaves thicker, round reniform, 3 to 7 cleft, with crenate lobes; peduncles, 2.5 to 7.5 cm. long, reflexed in fruit; capitate umbel 5 to 10-flowered; fruit, 2 to 3 mm. broad, with rather obscure ribs, and no layer of strengthening cells about the seed cavity; seed section oblong.

Type locality, "Mexico."

Eastern Pennsylvania to Florida, thence westward to Texas, California, and Washington.

Specimens examined:

PENNSYLVANIA: Near Wrightsville, York County, *Reed*, July 7, 1890.
DISTRICT OF COLUMBIA: Near Bennings Bridge, *Vasey*, in 1874; between Georgetown and Chain Bridge, *Vasey & Coville*, July 15, 1888.
MARYLAND: Great Falls of the Potomac, *Pollard*, July 4, 1896.
VIRGINIA: near Alexandria, *Rose & Coville*, May 24, 1890; Four Mile Run, *Steele*, July 31, 1896.
FLORIDA: Near Apalachicola, *Curtiss* 5888, June 12, 1897; *Chapman*.
NEW MEXICO: *Wright* 1102, in 1851.
CALIFORNIA: Near San Francisco, *Wilkes Exped.* 1460; same station, *Vasey* 220, July, 1880; *Lemmon* 63, in 1889; Los Angeles County, *Hasse*, August 26, 1890; San Bernardino County, *Parish*, June 20, 1891; near San Jose, *Jepson*, May 28, 1896; near San Francisco, *Alice Eastwood*, July, 1896.
OREGON: Near Portland, *Henderson* 368, in 1886.
WASHINGTON: Near Seattle, *Piper* 639, September 8, 1889.

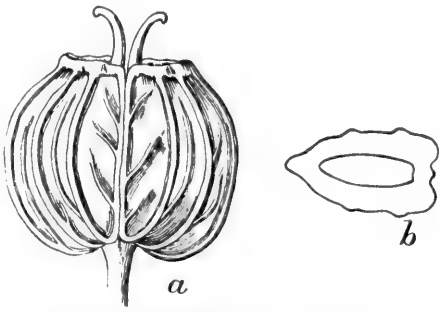


FIG. 2.—Centella asiatica: *a*, × 8; *b*, × 10.

2. **CENTELLA** L. Pl. Rar. Afr. 28. 1760; Amoen. Acad. **6**: 112. 1764.

Calyx teeth obsolete. Fruit orbicular to reniform, strongly flattened laterally. Carpel with 5 primary ribs and prominent secondary ribs and reticulations, the dorsal marginal and filiform; an oil-bearing layer beneath the epidermis, occasionally containing small oil tubes, and a thick layer of strengthening cells surrounding the seed cavity.

Perennial herbs, growing in or near the water, with slender creep-

ing stem, reniform or ovate-cordate leaves, and small white flowers in simple umbels with conspicuous involucre.

Type species, *C. villosa* L.

A genus of both hemispheres containing about 20 species, one of which is found in southern United States.

1. **Centella asiatica** (L.) Urban in Mart. Fl. Bras. **11**[1]: 287. 1879. FIG. 2.

Hydrocotyle asiatica L. Sp. Pl. **1**: 234. 1753.
H. repanda Pers. Syn. **1**: 302. 1805.
Glyceria repanda Nutt. Gen. **1**: 177. 1818.
Chondrocarpus repandus Nutt. Gen. **2**: in "Errata."

Smooth or somewhat pubescent; petioles (7.5 to 10 cm. or even 30 cm. long) and peduncles (7 cm. or less long) clustered on creeping stems or runners; leaves ovate-cordate, repand-toothed, thickish; the 2 to 4-flowered umbel subtended by an involucre of two conspicuous bracts; seed section narrowly oblong.

Type locality, "India."

Maryland to Florida and west to Texas.

Specimens examined:

MARYLAND: Ocean City, *Chickering*, September 12, 1878.

FLORIDA: Near Apalachicola, *Chapman*; St. Johns River above Palatka, *Curtiss* 992; Tampa, *Garber*, May, 1876; near Jacksonville, *Curtiss* 4332, 4961, May 9, 1893, and June 18, 1894; Duval County, *Fredholm*, July 1, 1893; near Eustis, Lake County, *Nash* 1031, June 16–30, 1894.

GEORGIA: *Durand*.

ALABAMA: *Drummond*, in 1832.

MISSISSIPPI: Horn Island, and Petit Bois Island, *Tracy*, May and June, 1898.

LOUISIANA: Lake Charles, *Daves*, in 1889.

TEXAS: *Lindheimer* 613, in 1847; Hempstead, *Hall* 241, June 10, 1872; near Hockley, *Thurow*, September, 1890.

The Asiatic specimens we have seen differ somewhat from the American forms, which may prove to be a distinct species.

Centella asiatica floridana C. & R.

Hydrocotyle asiatica floridana C. & R. Rev. N. Am. Umbell. 136. 1888.

Petioles 2.5 cm. long or less, making the leaves appear in rather close clusters along the rootstock, more or less pubescent; fruit somewhat larger and more or less pubescent.

Type locality, shore of St. Johns River near Jacksonville, Fla.; collected by *A. H. Curtiss*, no. 988; type in Herb. Coulter, duplicate in U. S. Nat. Herb.

Florida; also in the West Indies and Central America.

Specimens examined:

FLORIDA: *Curtiss* as cited under type locality.

3. **BOWLESIA** Ruiz & Pav. Prodr. Fl. Peruv. 44. pl. 34. 1794.

Calyx teeth rather prominent. Fruit broadly ovate, with narrow commissure (carpels appearing nearly distinct) and stellate pubescence.

Carpel turgid, becoming depressed on the back, with neither ribs nor oil tubes; the whole dorsal region inflated, the seed cavity being on the commissural side of the carpel section. Seed flattened dorsally; the face and back, plane or convex.

Slender branching annuals, with stellate pubescence, opposite simple (lobed) leaves, scarious lacerate stipules, and simple few-flowered umbels of white flowers on axillary peduncles.

Type species, *B. palmata* Ruiz & Pavon, Fl. Peruv. **3**:28. pl. 251. 1802.

A genus of about 20 species, chiefly South American.

Our generic characters are drawn chiefly from our own species, and do not entirely apply to all the South American forms.

1. **Bowlesia septentrionalis** C. & R., sp. nov. FIG. 3.

Weak, 5 cm. to 3 or even 6 dm. long, dichotomously branching; leaves thin cordate to reniform, 1.5 to 3 cm. broad, 3 to 5 lobed (lobes entire or toothed), on long, slender petioles; umbels 1 to 4 flowered, on short peduncles; fruit about 2 mm. long, sessile or nearly so.

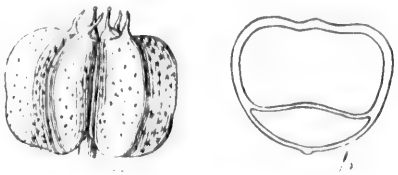


FIG. 3.—Bowlesia septentrionalis: *a*, *b*, ×8.

Type locality, near Tucson, Arizona; collected by *Myrtle Zuck*, May 16, 1896; type in U. S. Nat. Herb.

From Texas to southern California and north to the Sacramento Valley.

Specimens examined:

TEXAS: *Mex. Bound. Surv.* 410; near Austin, *Hall*, May 18, 1872; near Galveston, *Joor*, April, 1877; San Antonio, *Havard*, March, 1884; Round Rock, *Bodin*, January, 1890; Austin, *Bodin*, in 1891; Corpus Christi, *Heller* 1493, March 23–30, 1894.

ARIZONA: Verde Mesa, *Smart* 128, in 1867; banks of the Rillita, *Pringle*, April 10, 1881; Tucson, *Parish*, April, 1884; same station, *Toumey* 193, April 12, 1892; type specimens as cited under type locality.

CALIFORNIA: Monterey, *Mex. Bound. Surv.*, in 1850; near Fort Tejon, *Xantus de Vesey*, in 1857–58; *Bolander* 4633, in 1866; Humboldt, *Kellogg & Harford* 297, in 1868–69; San Diego, *Jones* 3065, March 14, 1882; Santa Monica, *Hasse*, April, 1891; Caliente, Kern County, *Brandegee*, April 4; Drytown, Amador County, *Hansen* 1561, April 8, 1896; near San Jacinto, *Leiberg* 3221, April 1, 1898.

Urban, in *Flora Brasiliensis*, states that the above forms are not *B. lobata* Ruiz & Pavon, as they have long been called, but refers them to *B. tenera* Spreng., which he makes a variety of *B. incana* Ruiz & Pavon. In many ways our plants seem nearer to *B. tenera* Spreng. than to any other described species, but that is a Brazilian form. They were taken by Nuttall to represent a good species, and are so labeled in the Philadelphia Academy, but his name is not now tenable.

4. SANICULA L. Sp. Pl. 1: 235. 1753.

Calyx teeth somewhat foliaceous, persistent. Fruit subglobose, densely covered with hooked bristles or tuberculate. Carpel with neither ribs nor strengthening cells. Stylopodium wanting. Oil tubes mostly large, 5 (3 dorsal and 2 commissural), or 3 to many irregularly distributed. Seed face from plane to deeply concave or sulcate.

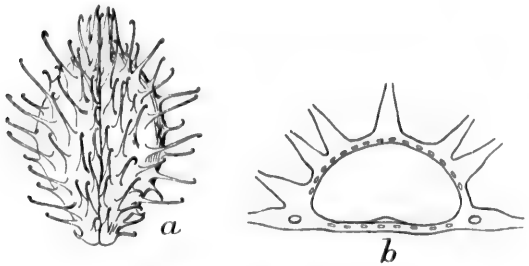


FIG. 4.—Sanicula trifoliata: *a*, × 4; *b*, × 10.

Smooth perennials, with almost naked or few-leaved stems, mostly palmate (pinnate in a few species) leaves with more or less pinnatifid or incised lobes, involucre and involucels present, and greenish-yellow or purple flowers in irregularly compound few-rayed umbels.

First species cited, *S. europaea* L.

A group of about 30 species belonging to both hemispheres, 18 of which occur in the United States and Canada.

Atlantic species; oil tubes 5 (except in *S. trifoliata*).
- Styles much longer than the bristles; sterile flowers often in separate umbellets.
  - Fruit not stipitate; bristles bulbous at base ..... 1. *S. marilandica.*
  - Fruit stipitate; bristles not bulbous at base ..... 2. *S. gregaria.*
- Styles shorter than the bristles; sterile flowers intermixed with the fertile, not in separate umbellets.
  - Oil tubes 5.
    - Fruit stipitate ..... 3. *S. canadensis.*
    - Fruit not stipitate ..... 4. *S. smallii.*
  - Oil tubes numerous ..... 5. *S. trifoliata.*

Pacific species; oil tubes irregular in number and distribution.
- Mature fruit pediceled or stipitate.
  - Involucels small.
    - Fruit bristly all over; leaves not with conspicuously winged rachis. 6. *S. menziesii.*
    - Fruit naked (at least less bristly) below; leaves with conspicuously winged rachis ..... 7. *S. arguta.*
  - Involucels conspicuous ..... 8. *S. arctopoides.*
- Mature fruit neither pediceled nor stipitate.
  - Leaves palmate in type.
    - Leaves palmately divided.
      - Leaves with main divisions confluent at base.
        - Involucels conspicuous ..... 9. *S. howellii.*
        - Involucels small ..... 10. *S. laciniata.*
      - Leaves with main divisions distinct at base.
        - The numerous peduncles arising in a cluster from near the base. 11. *S. nevadensis.*
        - Peduncles arising singly along the stem ..... 12. *S. septentrionalis.*

Leaves not palmately divided ..... 13. *S. maritima.*
Leaves more or less pinnately divided.
Stems not arising from tubers.
Leaves with winged rachis.
Rachis toothed; flowers purple (rarely yellow) ..... 14. *S. bipinnatifida.*
Rachis entire; flowers yellow ..... 15. *S. nemoralis.*
Leaves without winged rachis.
Leaves twice or thrice pinnate ..... 16. *S. bipinnata.*
Leaves ternate, then pinnate ..... 17. *S. saxatilis.*
Stems arising from tubers ..... 18. *S. tuberosa.*

1. **Sanicula marilandica** L. Sp. Pl. 1: 235. 1753.

S. canadensis marylandica Hitchcock, Trans. St. Louis Acad. 5: 497. 1891.

Mostly simple below and umbellately branching above, 4.5 to 12 dm. high; basal leaves 3 to 5-parted, the lateral leaflets divided nearly to the base, giving the appearance of a 5 or 7-parted leaf; the divisions mostly sharply cut and serrate, the teeth more or less mucronate tipped; upper leaves similar, but with shorter petioles, becoming sessile or nearly so above; umbellate peduncles 2 to 4, nearly equal, sometimes becoming 2 dm. long; umbels nearly regular, with 3 to 7 rays, involucre of few leaf-like or small bracts, and involucels of few small bractlets; sterile flowers numerous, either intermixed with the fertile or in separate umbellets; calyx of sterile flowers 2 mm. long, cleft below the middle, the lobes acute; fruit sessile, oval, 6 to 7 mm. long, including bristles (bulbous at base); commissural scar elliptical; seed face plane or slightly concave.

Type locality, "Marilandia, Virginia."

From Newfoundland to Georgia and westward to Colorado, northwestern Idaho, and Alberta.

Specimens examined: Among the very numerous specimens examined we cite only those from well-known sets.

NEWFOUNDLAND: Exploits River, *Robinson & Schrenk,* August 13, 1894.
MAINE: Dover, Piscataquis County, *Fernald* 235, June 26, 1895.
VERMONT: Manchester, *M. A. Day* 353, June 29, 1898.
CONNECTICUT: Milford, *Eaton,* September 13, 1893.
GEORGIA: Augusta, *McCarthy* 11, June, 1888.
SOUTH DAKOTA: Elk Canyon, *Rydberg* 731, June 29, 1892.
COLORADO: Durango, *Tweedy* 874, July, 1896.
MONTANA: Near Bozeman, *Rydberg* 681, July 7, 1896.
IDAHO: Lake Pend Oreille, *Sandberg* 763, July 28, 1892.
ALBERTA: St. Marys River, *Macoun* 10653, July 22, 1895.

2. **Sanicula gregaria** Bicknell, Bull. Torr. Bot. Club **22**: 354. 1895.

Like *S. marilandica*, but calyx of sterile flowers 1 mm. long, cleft to the middle, the lobes obtuse; fruit sessile but stipitate, 3 mm. long including bristles (not bulbous at base); commissural scar linear.

Type locality, "Van Cortlandt Park," New York City; collected by *Bicknell;* type in Herb. Columbia Univ.

From New Hampshire to North Carolina, and west to Ontario, Minnesota, Nebraska, and Arkansas.

Specimens examined:

NEW HAMPSHIRE: Walpole, *Fernald* 50, August 8, 1899.

ONTARIO: Near Ottawa, *Macoun* 4976, August 4, 1894.

NEW YORK: Near Ithaca, *Coville*, June 21, 1885; between the Hudson and Bronx rivers, *Bicknell*, September 4, 1892, and July 28, 1895.

DISTRICT OF COLUMBIA: Chevy Chase road, *Pollard* 280, May 26, 1895.

VIRGINIA: Near Belfield, Greenville County, *Heller* 908, June 19, 1893.

NORTH CAROLINA: Near Biltmore and slopes of Busbee Mountain, *Biltmore Herb.* 882, 4816, in 1896 and 1897.

WEST VIRGINIA: Near Sago, Upshur County, *Pollock*, May 18, 1895.

OHIO: Near Salem, *Wilkinson*, June, 1887.

MISSOURI: Near Independence, *Bush* 663, 730, June 9–July 13, 1896.

IOWA: *Fink*, in 1894.

NEBRASKA: Ponca, *Clements* 2559, June 15, 1893.

MINNESOTA: Near Winona, *Holzinger*, June 19, 1889; Fort Snelling, *Mearns*, June 3, 1891.

3. **Sanicula canadensis** L. Sp. Pl. 1: 235. 1753.

S. marylandica canadensis Torr. Fl. U. S. 302. 1824.

S. floridana Bicknell, Bull. Torr. Bot. Club **24**: 581. 1897.

From slender and nearly simple to stout and much branched, 3 to 12 dm. high, the branching mostly alternate and dichotomous; basal leaves palmately 3-parted, the lateral leaflets divided nearly to the base, giving the appearance of a 5-parted leaf; the divisions mostly sharply cut and serrate, the teeth more or less mucronate-tipped; upper leaves similar, but with shorter petioles, becoming sessile or nearly so above; umbels irregular, one to few-rayed, with involucre of few leaf-like or small bracts, and involucels of few small bractlets; sterile flowers few and on short pedicels; fruit sessile, but distinctly stipitate, suborbicular, 3 to 6 mm. long (including bristles), the calyx inconspicuous among the bristles; styles shorter than the calyx; seed-face convex.

Type locality, "Virginia."

From Vermont to Florida, and westward to Nebraska, Kansas, and Texas.

Specimens examined: Among the various numerous specimens examined we cite only those from well-known sets.

NEW YORK: Between the Hudson and Bronx rivers, *Bicknell*, October 14, 1894.

PENNSYLVANIA: Near mouth of Tucquan, Lancaster County, *A. A. Heller & E. Gertrude Heller*, September 12, 1891.

VIRGINIA: Near Belfield, Greenville County, *Heller* 982, June 19, 1893.

WEST VIRGINIA: Near Oceana, Wyoming County, *Morris* 1330, August 22, 1900.

GEORGIA: On Little Stone Mountain, Dekalb County, *Small*, July 25, 1893.

ALABAMA: Auburn, Lee County, *Earle & Baker*, May 28, 1898; Lee and Madison Counties, *Pollard & Mason* 38, 84, 379, July 9–August 1, 1900.

TENNESSEE: Knox County, *Kearney*, July 9, 1894; Wolf Creek, Cocke County, *Kearney* 709, September 2, 1897.

KENTUCKY: Cliffs of Kentucky River, *Rose*, August 15, 1895.

MISSOURI: Courtney, Jackson County, *Bush* 709, July 14, 1896.

KANSAS: Near Osborne City, *Shear* 173, July 20, 1894; Cowley County, *White*, June 28, 1898.

TEXAS: "Fort Smith to the Rio Grande," *Bigelow*, July 22, 1853.

Mr. E. P. Bicknell based his *S. floridana* upon the Duval County specimens of *Curtiss* (no. 994). This plant appears to be distinct enough, but on account of numerous intergrading forms, covering a wide range and frequently associated with true *S. canadensis*, we can not separate the two. The *floridana* forms, extending from Florida to Arkansas and eastern Texas and north to North Carolina and Kentucky, seem to be associated with dry sandy ground conditions. Among these are the following: *Coville* 92, near Argenta, Ark., July 14, 1887; *Rose*, in the Green River region of Kentucky, August 21, 1895; *Biltmore Herb.* 3408*a*, near Wrightsville, N. C., July 1, 1897; *Rose* 4167, near Houston, Tex., May 6, 1899.

4. **Sanicula smallii** Bicknell, Bull. Torr. Bot. Club **24**: 578. 1897.

In habit resembling the simpler forms of *S. canadensis*, the mostly simple stem being once or twice dichotomously branched; fruit larger, 5 to 6 mm. long (including the bristles), not at all stipitate; styles a little longer than the calyx; otherwise as in *S. canadensis*.

Type locality, "base of Little Stone Mountain," Georgia; collected by *John K. Small*, June 1893; type in Herb. Columbia Univ.

Tennessee, Alabama, Georgia, and Florida.

Specimens examined:

TENNESSEE: Along Wolf Creek, Cocke County, *Kearney* 710, September 2, 1897.

ALABAMA: Montesano, near Huntsville, Madison County, *Pollard & Maxon* 377, August 1, 1900.

GEORGIA: Base of Little Stone Mountain, Dekalb County, *Small*, July 25, 1893.

FLORIDA: Tallahassee, *Nash* 2362, August 7–9, 1895.

The only two characters, as given by Mr. Bicknell, which do not break down in separating this species from *S. canadensis* are the longer styles and the fruit not all stipitate. As these two characters look toward *S. marilandica* they suggest that *S. smallii* may possibly be a hybrid of *S. canadensis* and *S. marilandica*.

5. **Sanicula trifoliata** Bicknell, Bull. Torr. Bot. Club **22**: 359. 1895.

FIG. 4.

Similar in habit to *S. canadensis;* sterile flowers on pedicels 4 to 5 mm. long; fruit not stipitate, elliptical, 6 to 7 mm. long including the calyx, which forms a conspicuous beak about as long as the bristles; commissural scar very broad; seed-face slightly concave.

Type locality not given, the species being based upon specimens from Indiana, Ohio, Connecticut, and Canada; type in Herb. Columbia Univ.

From Maine to Connecticut and west to Ontario, Indiana, and West Virginia.

Specimens examined:

MAINE: Manchester, *Scribner*, in 1873.

VERMONT: Near Manchester, *M. A. Day* 354, June 27, 1898.

NEW YORK: Near Ithaca, *Coville*, July 26, 1885; Yonkers, *Bicknell*, September 22, 1895.

WEST VIRGINIA: Quinnimont, *Pollard & Maxon* 14, August 21, 1899; near Hinton, Summers County, *Morris* 961, July 9, 1900.

OHIO: Pittsfield, Lorain County, *Ricksecker*, July 9, 1894.

A very distinct species, and differing from all other Eastern forms in its numerous oil tubes.

6. **Sanicula menziesii** Hook. & Arn. Bot. Beechey 142. 1832.

Sanicula undicaulis Hook & Arn. Bot. Beechey 347. 1840.

Stem solitary, erect, 3 to 10.5 dm. high, branching; leaves round-cordate, 5 to 10 cm. broad, very deeply 3 to 5-lobed, the broad segments sharply toothed or somewhat cleft, the teeth bristle-tipped; upper leaves more narrowly lobed and laciniately toothed; umbel with 3 or 4 slender rays, involucre of 2 or 3 small leaf-like bracts, and involucels of 6 to 8 small entire bractlets; flowers yellow, the sterile ones short-pedicelled; fruit sessile, but distinctly stipitate, obovate, 2 to 4 mm. long, covered with strong bristles; seed face sulcate.

Type locality not given; but collected by *Menzies* on the "Northwest coast of America," according to Hooker.

From southern California to Vancouver Island and the coast of British Columbia.

Specimens examined:

CALIFORNIA: *Douglas*, in 1833; *Bigelow*, in 1853–54; *Bolander*, in 1866; San Francisco, *Kellogg & Harford* 301, April 30, 1868; Berkeley, *G. R. Vasey*, May 19, 1875; San Luis Obispo, *Jones* 2735, May 9, 1882; Berkeley, *Greene*, May 20, 1889; San Diego County, *Orcutt*, May, 1889; Los Angeles, *Hasse*, May, 1892; San Bernardino Mountains, altitude 500 to 750 meters, *Parish* 3480, 4166, in 1894 and 1896; Little Chico Creek, *Mrs. R. M. Austin*, May, 1896; Amador County, *Hansen* 75, April 29, 1893, and 1451, 1559, 1655, April and May, 1896; Santa Catalina Island, *Blanche Trask*, June, 1897; near San Bernardino, *Leiberg* 3322, April 25, 1898; Mendocino county, *Brown* 825, June, 1898.

WASHINGTON: Columbia River, Klickitat County, *Suksdorf*, May 6–25, 1885; Seattle, *Piper* 643, May 29, 1889; Thurston and King counties, *Henderson*, June, 1892.

BRITISH COLUMBIA: Nanaimo, Vancouver Island, *Macoun*, June 9, 1887.

Professor Greene prepared the following note when at Kew in November, 1894. "*Sanicula undicaulis* a miserable specimen of *S. menziesii* with stout main stem broken off and thrown away to save space; two abnormal scapiform subbasal branches, with each a pair of opposite leaves subtending condensed and abnormal inflorescence. Hooker did not compare it with *laciniata*, but mounted it on the same sheet with *menziesii*, where it belongs."

7. **Sanicula arguta** Greene, sp. nov. in herb.

Stems more or less branching, 1.5 to 4.5 dm. high, from a thickened rootstock; leaves palmately 5-parted, the middle division elongated and distant, all the divisions more or less pinnately lobed and toothed, decurrent upon the rachis, forming a broad toothed wing; teeth spinosely pointed; umbel 3 to 5-rayed, with involucre of leaf-like bracts, and involucels of linear to linear-lanceolate spinosely pointed bractlets; flowers yellow, the sterile ones on pedicels 3 to 4 mm. long; fruit obovate, tapering into a stipitate base, somewhat naked below, more bristly above, 6 mm. long.

Type locality, hills near San Diego, California; collected by *C. G. Pringle*, 1882; type in U. S. Nat. Herb.

Southern California.

Specimens examined:

CALIFORNIA: Monterey, *Parry*, in 1850; San Diego, *Orcutt* 112, March, 1882; San Luis Obispo, *Mrs. R. W. Summers*, March, 1882; San Diego, *Jones* 3149, April 19, 1882; same station, *Pringle*, May 6, 1882; Oakland Hills, *Lemmon* 14, April, 1889; Los Angeles, *Hasse*, April, 1888, and May, 1892; San Ysabel, *Henshaw* 201, March 29, 1893; Santa Catalina Island and San Nicholas Island, *Blanche Trask*, April, 1896 and 1897.

8. **Sanicula arctopoides** Hook. & Arn. Bot. Beechey 141. 1832.

Stems very short, from thickened rootstocks, bearing a tuft of leaves and several (often much longer) divergent scape-like branches 5 to 30 cm. long, each bearing an umbel of 1 to 4 elongated rays; leaves deeply palmately 3-lobed, the cuneate divisions once or twice laciniately cleft, usually dissected into lanceolate acute spreading segments; involucre of 1 or 2 similar leaf-like bracts; umbellets large, 6 to 12 mm. in diameter, with conspicuous involucels of 8 to 12 narrowly oblanceolate mostly entire bractlets much exceeding the yellow flowers; fruit short-pediceled, 2 to 3 mm. long, naked at base, with strong bristles above; seed face almost plane.

Type locality not given; but collected by *Menzies* on the "Northwest coast of America," according to Hooker.

From southern California to Vancouver Island and the coast of British Columbia.

Specimens examined:

CALIFORNIA: *Thomas Coulter* 204; *Bigelow*, in 1853–54; San Francisco, *Bolander*, in 1866; same station, *Kellogg & Harford* 209, in 1868–69; same station, *E. R. Drew*, March 23, 1888; same station, *Greene*, April 21, 1889; Monterey, *Cloud Rutter* 198, March 25, 1895; near Mendocino, Mendocino County, altitude 150 meters, *Brown* 734, May, 1898.

OREGON: *Mrs. Nevius.*

9. **Sanicula howellii** C. & R. Bot. Gaz. **13**: 81. 1888.

Stems coarse, 3 dm. or less high, more or less buried in the sand, often bearing tufts of stout elongated peduncles and leaves; leaves broad and palmately 3 to 5-lobed (often much modified by burial in the sand), the upper inclined to be pinnately lobed, the divisions rather sharply cut and toothed, the teeth mucronate-tipped; umbels unequally few-rayed, with involucre of few leaf-like bracts, and involucels of very prominent bractlets, sometimes much exceeding the large globose head of fruit; flowers yellow; fruit apparently sessile, bristly all over, 3 to 4 mm. long; seed face concave.

Type locality, "sandy shores, Tilamook Bay and Ocean Beach, Oregon"; collected by *Howell*, no. 16, July 15, 1882; type in Herb. Coulter, duplicate in U. S. Nat. Herb.

From the coast of Oregon to Vancouver Island.

Specimens examined:

OREGON: Type specimen, as cited under type locality; same station and date, *Henderson* 1584; same station, *Howell* 1365, May 14, 1887, and in 1888.

WASHINGTON: Shores of Puget Sound, *Wilkes Exped.* 71.

BRITISH COLUMBIA: Beacon Hill, Vancouver Island, *Macoun*, May 25, 1887.

10. **Sanicula laciniata** Hook. & Arn. Bot. Beechey 347. 1840.

Usually slender plants, 1 to 6 dm. high; leaves broadly ovate to orbicular in outline, from slightly 3-lobed to deeply 3-parted, the divisions from toothed to laciniately cut, with bristle-tipped teeth; umbel 3 to 5-rayed, with involucre of leaf-like bracts, and involucels of small lanceolate apiculate bractlets; flowers yellow; fruit orbicular, not at all stipitate, 3 mm. long.

Type locality, in California; collected by *Douglas*.

From Mendocino County to San Diego County, Cal.

Specimens examined:

CALIFORNIA: *Bigelow*, in 1853–54; Sonoma County, *E. Samuels* 88; *Kellogg & Harford* 298, March 31, 1869; Santa Rosa, Sonoma County, *Holman*, March, 1884; Mount Tamalpais, near San Francisco, *Greene*, March 30, 1889; San Rafael, Marin County, *Lemmon* 30, in 1889; San Diego, *Dunn*, March 27, 1891; Bolinas Ridge, Marin County, *Palmer* 2302, June 14–16, 1892; San Diego County, *Alderson*, March, 1894; Mendocino County, *Brown* 705, May, 1898.

Hooker's American species of Sanicula were referred to Mr. Pearson, of Kew. His full report has not reached us, but his brief synopsis received while reading page proof justifies our exclusion of *S. nudicaulis* from *S. laciniata*.

11. **Sanicula nevadensis** Watson, Proc. Am. Acad. **11**: 139. 1876

Low, with very short stems, the numerous stoutish peduncles arising from near the base, 2 dm. or less high; leaves ternate, the divisions oblong-ovate, 3 to 5-lobed; the segments lobed or toothed; umbels with 3 to 10 rays, involucre of pinnatifid leaf-like bracts, and involucels of small oblong acute more or less united bractlets; fruiting rays 1.5 to 3.5 cm. long; flowers yellow, the sterile ones on pedicels 2 to 3 mm. long; fruit bristly all over, 3 mm. long; seed face concave.

Type locality, "Plumas County, Cal.;" collected by *Mrs. M. E. P. Ames* and by *Lemmon;* type in Herb. Gray.

Mountains of eastern California.

Specimens examined:

CALIFORNIA: Plumas County, *Mrs. M. E. P. Ames*, in 1872; same station, *Lemmon*, in 1875 and 1889; Siskiyou County, *Greene* 741, in 1876; Hornbrook, Stanislaus County, *Howell* 1364, April 16, 1889; Sierra County, *Sonne* 357, June 5, 1892; Modoc County, *Baker*, June–August, 1893; San Bernardino Mountains, altitude 1,800 meters, *Parish* 3501, June 26, 1894; Forestdale, Modoc County, *Baker & Nutting*, June 15, 1894; San Bernardino Mountains, *Parish* 3762, June 29, 1895; Eldorado County, *Hansen* 1116, June 13, 1895; Pah Ute Pass, altitude 1,500 to 1,800 meters, *Purpus* 5093, in 1897; San Bernardino Mountains, altitude 1,800 meters, *Leiberg* 3330, April 25, 1898.

As pointed out by Professor Greene, *S. nevadensis* has been made to include too many forms. We restrict it here to its original limitations. The more northern forms, heretofore referred to this species, will be found under *S. septentrionalis*.

12. **Sanicula septentrionalis** Greene, Erythea **1**: 6. 1893.

S. divaricata Greene, Erythea **3**: 64. 1895.

Erect, slender, from a tuberous or elongated thick root, from almost

simple to divaricate branching, from 1 to 3.5 dm. high; basal leaves few and small, ternate or biternate, the obovate segments cleft or coarsely toothed; stem leaves few, mostly more sharply cleft or toothed; peduncles usually much elongated and often spreading; umbels with 3 to 5 rays, involucre of pinnatifid leaf-like bracts, and involucels of small oblong acute more or less united bractlets; fruiting rays 1.5 to 3.5 cm. long; flowers yellow, the sterile ones on pedicels 1 mm. long; fruit 4 mm. long, covered all over with long bristles; seed face plane.

Type locality, "Chase River, Vancouver Island"; collected by *Macoun*, June 4, 1887; type in Herb. Greene.

From northern California to Vancouver Island and western Montana.

Specimens examined:

CALIFORNIA: Plumas County, *Mrs. R. M. Austin*, May, 1880; Independence Lake, Nevada County, *Sonne* 8, June 26, 1892; near Castle Peak, *Greene*, July 20, 1893; Big Valley Mountains, Modoc County, *Baker & Nutting*, June 15, 1894.

OREGON: Oakland, *Howell* 181, April, 1881; ridges near The Dalles, *Howell*, June 20, 1882; sterile mountain ridges, altitude 1,800 meters, *Cusick* 960, August, 1884.

WASHINGTON: East of Cascade Mountains, *Wilkes Exped.* 834; Klickitat County, *Suksdorf* 20, April 25, 1881; Falcon Valley, *Suksdorf* 93, June, 1883; Yakima County and Kittitas County, *Henderson* 2577, August 4, 1892; *F. H. Snow*, Blue Mountains, Wallawalla County, *Piper* 2338, July 15, 1896; same station, *Horner* 214, July 29, 1897; steep dry slope in the Goat Mountains, Cascades, altitude 1,650 meters, *O. D. Allen* 254, in 1896.

IDAHO: Cuddy Mountains, *Jones*, July 1, 1899.

MONTANA: Columbia Falls, *Williams* 982, June, 1893 and 1894.

BRITISH COLUMBIA: Cedar Hill, Vancouver Island, *Macoun*, May 14, 1887; Chase River, Vancouver Island, *Macoun*, June 4, 1887; near Victoria, Vancouver Island, *Macoun* 295, May 19, 1893.

These forms have all been confused with *S. nevadensis*, although they represent a very distinct species and one well separated by Professor Greene. After an examination of Californian specimens, including Professor Greene's type of *S. diravicata*, we can not distinguish it from *S. septentrionalis*. Selected specimens of the two are quite different in habit, but these differences seem to us not at all constant, and the two have in common the more technical characters which distinguish this species from *S. nevadensis*.

13. **Sanicula maritima** Kellogg, Bot. Calif. **2**: 451. 1880.

Stems stout, 3 dm. or more high from a thickened rootstock; basal leaves long-petioled, somewhat cordate, very obtuse, entire or sparingly denticulate or crenulate, 5 to 10 cm. long, 3.5 to 4.5 cm. broad; stem leaves one or few, smaller and more or less lobed or parted (as are sometimes the basal leaves); peduncles few and elongated; umbel with 1 to 3 rays, involucre of large leaf-like lobed or parted bracts, and involucels of numerous small lanceolate bractlets; flowers in dense heads, the sterile ones short-pediceled; fruit somewhat naked below, bristly above, 3 to 4 mm. long; seed face concave, with a very prominent central longitudinal ridge.

Type locality, "near the coast about San Francisco or northward;" collected by *Kellogg*.

Coast about San Francisco, Cal.

Specimens examined:

CALIFORNIA: Alameda (type locality), *Greene*, May, 1888 and 1889; Potrero Hills, San Francisco, *Alice Eastwood*, April, 1894.

14. **Sanicula bipinnatifida** Dougl. in Hook. Fl. Bor. Am. 1: 258. pl. 92. 1834.

Stems 3 dm. or more high, from a thickened rootstock, with usually a cluster of leaves at base, and 1 to 3 leaves above; leaves pinnately 3 to 7-parted, the divisions incisely toothed or lobed, decurrent on the rachis and forming a toothed wing, teeth acute or slightly pointed; umbel with 3 or 4 elongated rays, involucre of leaf-like bracts, and involucels of small narrow acute bractlets; flowers purple (rarely yellow), in dense heads, the sterile ones pedicelled; fruit bristly all over, 3 mm. long; seed face broadly concave, with a prominent central longitudinal ridge.

Type locality, "Fort Vancouver on the Columbia;" collected by *Douglas* and *Scouler;* type in Herb. Kew.

From Vancouver Island to southern California, and extending into Lower California.

Specimens examined:

CALIFORNIA: *Bigelow*, in 1853–54; Oakland, *Bolander*, in 1866; Mission, San Francisco, *Kellogg & Harford*, in 1868; Sierra Nevada Mountains, *Lemmon*, in 1875; San Diego County, *Lemmon*, June, 1884; Santa Rosa, Sonoma County, *Holman*, May, 1884; near San Diego, *Orcutt* 145, March 21, 1885; near Visalia, *Patterson*, May 17, 1886; San Bernardino County, *Parish* 1998, May, 1887; Highland Springs, *Simonds*, June, 1888; Los Angeles County, *Davidson*; Plumas County, *Lemmon*, May, 1889; San Diego County, *Orcutt*, May, 1889; San Francisco County, *Michener & Bioletti*, April, 1891; San Diego County, *Alderson*, March, 1894; San Ysabel, *Henshaw* 222, April 15, 1893; Amador County, *Hansen* 1296, 1298, April, 1894 and 1895; Goose Valley, Shasta County, *Baker & Nutting*, May 26, 1894; Little Chico Creek, *R. M. Austin* 214, April, 1896; Butte County, *Brown*, April 15–30, 1897.

OREGON: Near Cushyville, *Howell*, June 12, 1888.

WASHINGTON: Puget Sound, *Wilkes Exped.* 76.

BRITISH COLUMBIA: Cedar Hill, Vancouver Island, *Macoun*, May 24, 1887; near Victoria, Vancouver Island, *Macoun*, May 27, 1893.

15. **Sanicula nemoralis** Greene, Erythea 1: 6. 1893.

"Erect, rather slender, a foot high, from a perpendicular root; leaves mostly radical, bipinnately 3 to 7-parted, the divisions decurrent upon the rachis as a narrow entire wing; the several ascending branches bearing compound umbels with elongated rays; flowers few in the head, yellow; fruit small, broader than long, the whole surface covered with uncinate prickles which are strongly fistulate-enlarged or inflated from the base to near the middle."

Type locality, "Big Trees" and "Yosemite Valley;" collected by *Bolander;* type apparently lost.

We have not seen this plant, and hence quote Professor Greene's description, in which he says that it may "represent what has been called a yellow-flowered state of *S. bipinnatifida.*"

16. **Sanicula bipinnata** Hook. & Arn. Bot. Beechey 347. 1840.

Slender, 2 to 4 dm. high, from a slender fusiform root; leaves twice or thrice pinnate, with divisions not at all decurrent, cuneate-oblong to ovate, incisely and mucronately toothed; umbel 3 or 4-rayed, with involucre of leaf-like bracts, and involucels of a few small bractlets more or less united; flowers yellow; fruit 3 mm. long, with strong tubercles tipped with short hooked bristles; seed face deeply sulcate, sometimes inclosing a central cavity, with a central longitudinal ridge.

Type locality, in California; collected by *Douglas.*

California.

Specimens examined:

CALIFORNIA: *Thomas Coulter* 208; *Kellogg & Harford* 300, in 1868–69; *Lemmon* 65; Solano County, *Jepson,* March 24, 1892; Stanford University, *Rutter* 32, February 24, 1895; near Midway, Alameda County, *Greene,* May 3, 1895; Santa Maria, Santa Barbara County, *Ida M. Blochman* 26, April 3, 1895; Butte County, *Mrs. R. M. Austin* 249, April, 1896; Amador County, *Hansen* 1577, April 8, 1896; Santa Lucia Mountains, Monterey County, *Plaskett,* March, 1898.

17. **Sanicula saxatilis** Greene, Erythea 1:6. 1893.

Stems numerous, branching and spreading from the base, about 3 dm. long, from a thick root; leaves ternate, then pinnate, the ultimate segments broad, coarsely toothed; flowering branches repeatedly dichotomous, with pedicellate heads in the forks; involucels small, of very unequal foliaceous entire or toothed bractlets; flowers salmon color; sterile flowers on pedicels 6 mm. long; fruit 3 mm. long, strongly tuberculate, the upper tubercles tipped with a much reduced subulate and hooked bristle; seed face plane.

Type locality, "summit of Mount Diablo," California; collected by *Greene,* June, 1892; type in Herb. Greene.

Specimens examined:

Type specimen the only one seen.

18. **Sanicula tuberosa** Torrey, Pacif. R. Rep. 4[1]:91. 1856.

Stems 1 to 6 dm. high, from a small globose tuber; leaves twice or thrice pinnate, usually very finely divided, ultimate segments very small; umbel 1 to 4-rayed, with involucre of leaf-like bracts, and involucels of small unequally united bractlets; flowers yellow, the sterile ones on long pedicels; fruit broader than long, more flattened laterally than in any other species, 2 mm. long, tuberculate, and not at all bristly; seed somewhat laterally flattened, with plane face.

Type locality, "hillsides, Duffield's Ranch, Sierra Nevada," California; collected by *Bigelow;* type in Herb. Columbia Univ.

California, extending into Lower California.

Specimens examined:

CALIFORNIA: *Bigelow*, in 1853–54; *Bolander* 4644, in 1866; *Rattan* 300, in 1860–1867; Ukiah, *Kellogg & Harford* 302, May 5, 1869; Fall Brook, *Jones* 3098, March 23, 1882; Los Angeles, *Hasse*, May, 1888 and 1889; Green Horn Mountains, altitude 1,800 to 2,100 meters, Kern County, *Palmer* 48, June 7–15, 1888; Humboldt County, *Marshall*, in 1888; same station, *Chesnut & Drew;* San Rafael, *Brandegee*, April, 1889; Plumas County, *Lemmon* 31, May 28, 1889; Summit, *Greene*, July 19, 1893; Lassen County, *Baker & Nutting*, July 9, 1894; Santa Barbara County, *Ida M. Blochman*, April 3, 1895; Eldorado County, *Hansen* 1117, June 11, 1895; Butte County, *Mrs. R. M. Austin* 302, July, 1896; Amador County, *Hansen* 68, March 20, 1896.

Professor Greene regards this species as an aggregate, and the diversity in habit suggests this as a possibility. With the material at hand, however, we do not feel justified in attempting any segregation.

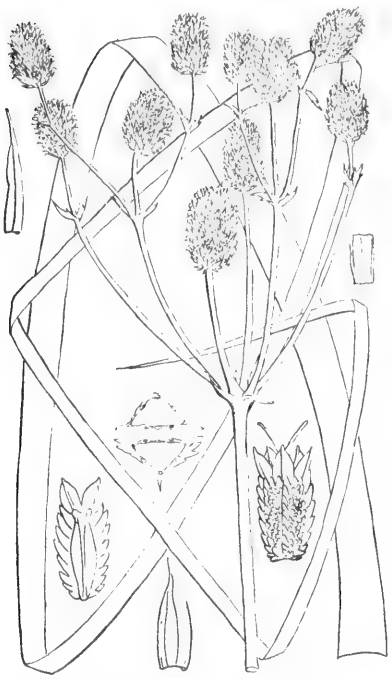


FIG. 5.—Eryngium sparganophyllum.

5. **ERYNGIUM** L. Sp. Pl. 1: 232. 1753.

Sepals very prominent, rigid, and persistent. Fruit ovoid, flattened laterally, covered with hyaline scales or tubercles. Carpel with ribs obsolete. Stylopodium wanting; styles short or long, often rigid. Oil tubes mostly 5 (3 dorsal and 2 commissural). Seed face plane.

Glabrous perennials, with leaves often rigid, coriaceous, spinosely toothed or divided, and white or blue flowers sessile in dense bracteate heads. The outer *bracts* form the involucre; the inner ones, *bractlets*, intermixed with the flowers, represent the involucels.

First species cited, *E. foetidum* L.

A group of about 200 species distributed chiefly throughout temperate and subtropical regions, 29 of which occur in the United States and Canada.

LEAVES elongated linear, coriaceous, parallel-veined, either entire or with margin sparingly bristly.

Leaves with numerous marginal bristles.

Marginal bristles remote and solitary ..... 1. *E. yuccifolium.*

Marginal bristles more numerous and in clusters of 2 to 4 .... 2. *E. synchaetum.*

Leaves with no marginal bristles (rarely 1 or 2) ..... 3. *E. sparganophyllum.*

LEAVES not parallel-veined, variable in form and texture.
BASAL LEAVES not at all spiny-toothed.
Plants low and slender, mostly prostrate, with small thin leaves.
Bractlets longer than flowers; fruit strongly tuberculate ..... 4. *E. baldwinii.*
Bractlets shorter than flowers; fruit not strongly tuberculate ..... 5. *E. prostratum.*
Plants erect and mostly tall; leaves thick; eastern (except *E. phyteumae*).
Leaves elongated, the petioles long and fistulous.
Bractlets entire.
Heads oblong, with a terminal tuft of conspicuous bractlets. 6. *E. phyteumae.*
Heads globose, without conspicuous terminal bractlets.. 7. *E. floridanum.*
Bractlets 3-toothed.
Bractlets with unequal teeth (middle one largest) ..... 8. *E. aquaticum.*
Bractlets with equal teeth.
Slender, 4.5 to 9 dm. high ..... 9. *E. ravenelli.*
Stout and taller (12 to 18 dm.) ..... 10. *E. mettaueri.*
Leaves small, with short petioles.
Upper leaves simple; bractlets tricuspidate ..... 11. *E. integrifolium.*
Upper leaves palmately parted; bractlets entire ..... 12. *E. hookeri.*
BASAL LEAVES spiny-toothed (sometimes reduced to nodose petioles).
Southern and southwestern species.
Heads small (12 mm. or less); sepals entire.
Bractlets 3-toothed ..... 13. *E. aromaticum.*
Bractlets entire.
Stems low and diffusely branching; bracts less conspicuous, green within. 14. *E. diffusum.*
Stem erect, less branching; bracts very conspicuous, not green within.
Bracts linear-lanceolate; lower leaves pectinate-dentate or with triangular bristly teeth ..... 15. *E. wrightii.*
Bracts broadly cuneate; lower leaves not pectinate-dentate. 16. *E. lemmoni.*
Heads large (25 to 35 mm. long); sepals 3 to 5-cuspidate.. 17. *E. leavenworthii.*
Pacific slope species.
Styles shorter than sepals.
Bracts and bractlets entire ..... 18. *E. armatum.*
Bracts and bractlets not entire.
Bractlets little longer than the usually blue heads.... 19. *E. articulatum.*
Bractlets twice as long as the heads, which are never blue ..... 20. *E. petiolatum.*
Styles longer than sepals.
Bractlets but little longer than flowers.
Bracts weak and reflexed ..... 21. *E. elongatum.*
Bracts rigid and not reflexed.
Bracts much longer than the heads ..... 22. *E. jepsoni.*
Bracts little, if at all, longer than the heads.
Heads small (about 6 mm.) ..... 23. *E. minimum.*
Heads larger (9 to 10 mm.) ..... 24. *E. alismaefolium.*
Bractlets much longer than the flowers.
Bracts narrowly lanceolate and spreading, entire ..... 25. *E. longistylum.*
Bracts very narrow and rigid, more or less spinose-bristly.
Bracts with conspicuous scarious margin at base.
Erect and tall; bracts 18 to 20 mm. long ..... 26. *E. oblanceolatum.*
Prostrate; bracts about 10 mm. long ..... 27. *E. aristulatum.*

Bracts not at all scarious-margined.
Bractlets spinose-toothed ..... 28. *E. vaseyi.*
Bractlets entire or nearly so..... 29. *E. pavishii.*

1. **Eryngium yuccifolium** Michx. Fl. Bor. Am. **1**: 164. 1803.

E. aquaticum L. Sp. Pl. ed. 2. 336. 1762 in part, not ed. 1 (*fide* Britten & Baker, Jour. Bot. **38**: 243. 1900).

From 3 to 18 dm. high, branching above; leaves broadly linear (from 4 to 25 mm. wide or more), tapering to a point, with remotely bristly margins, the lower ones sometimes becoming 6 to 9 dm. long; heads pedunculate, ovate-globose (18 mm. long), with ovate-lanceolate mostly entire cuspidate-tipped bracts shorter than the head, and similar bractlets; fruit scaly, about 2 mm. long, with short ovate calyx lobes, and long rigid styles.

Type locality, "in paludosis Virginiæ."

From Connecticut to Florida, west to Minnesota, Kansas, and Texas; also sparingly naturalized in Connecticut (near Bridgeport).

Specimens examined: We cite but few of the very numerous specimens of this common species.

VIRGINIA: Pittsylvania County, *Heller* 1104, July 20, 1893.
NORTH CAROLINA: Catawba County, *Small & Heller* 60, June 25–26, 1891.
GEORGIA: Lookout Mountain, *Ruth* 424, July, 1898.
ILLINOIS: Champaign County, *Rose & Clinton*, August 28, 1895.
IOWA: Fayette County, *Fink* 188, July 19, 1894.
KANSAS: Lawrence, *Stevens*, July.
ALABAMA: Auburn, Lee County, *Earle & Baker*, June 19, 1897; same station, *Pollard & Maxon* 78, July 10, 1900.
TEXAS: Industry, *Wurzlow*, in 1895.

2. **Eryngium synchaetum** (Gray) C. & R.

E. yuccaefolium synchaetum Gray in C. & R. Rev. N. Am. Umbell. 94. 1888.

Resembling *E. yuccifolium*, but smaller and usually more simple; leaves more bristly margined, and bristles in clusters of 2 to 4; heads more globose, 6 to 15 mm. in diameter.

Type locality, "Florida" in dry pine barrens near Jacksonville; collected by *Curtiss*, no. 996; type in Herb. Gray.

From Georgia and Florida to Arkansas and eastern Texas.

Specimens examined:

GEORGIA: Leesburg, *Earle*, June 20, 1895.
FLORIDA: Near Jacksonville, *Curtiss* 996*, July, 1875; St. Augustine, *M. C. Reynolds*, May 20, 1886; near Jacksonville, *Curtiss* 4336, 5034, July, 1893, 1894; near Eustis, Lake County, *Nash* 1216, 1487, July 9–31, 1894.
ALABAMA: Spring Hill, *Bush* 353, August 20, 1897.
MISSISSIPPI: Ocean Springs, *Tracy*, August 8, 1889; Biloxi, *Tracy*, June and July, 1891 and 1898; Ocean Springs, *Pollard* 1071, July 27, 1896.
ARKANSAS: Fort Smith, *Bigelow*, in 1853–54.
TEXAS: Eastern Texas, *Hildebrand.*

3. **Eryngium sparganophyllum** Hemsl. in Hook. Icon. IV. **6**: pl. 2508. 1897. FIG. 5.

E. longifolium Gray, Pl. Wright. **2**: 65. 1853, not Cav. Ann. **2**: 133. 1793.

Stem tall, dichotomously branching; basal leaves (sometimes 9 to 12 dm. long) linear, tapering to a point, entire (rarely with 1 or 2 bristle teeth), strongly involute when dry; heads oval, 12 to 24 mm. long, with short ovate-lanceolate bracts and similar bractlets; fruit 4 mm. long, with large scales at the angles, and smaller ones between.

Type locality, "Las Playas Springs, near the Sierra de los Animos," New Mexico; collected by *Wright*, no. 1103, in 1851, and not since discovered; type in U. S. Nat. Herb.

Specimens examined:

NEW MEXICO: As cited under type locality.

4. **Eryngium baldwinii** Spreng. Syst. **1**: 870. 1825.

Prostrate, often rooting at the joints, diffusely branched; lower leaves oblong, usually long-petioled, from entire to laciniately toothed; upper leaves much smaller, 3-parted (rarely entire or lobed), the divisions from lanceolate to filiform, toothed or entire; heads usually narrowly oblong at maturity (about 6 mm. long), with involucre of subulate bracts, and similar bractlets; flowers light blue; fruit 1 mm. long, with very prominent tubercles, ovate calyx-lobes shorter than the fruit, and styles 2 mm. long; oil tubes medium sized; seed face plane.

Type locality, "Carolina, Florida."

Sandy soil, from Georgia and Florida to Louisiana and Missouri; although all the material we have seen is from Florida.

Specimens examined:

FLORIDA: Apalachicola, *Chapman;* Biscayne Bay, *Palmer* 194, in 1874; St. Augustine, *Mary C. Reynolds*, in 1875; Lake Monroe, *Garber*, March, 1876; Indian River, *Curtiss* 1002, June, 1879; Mosquito Inlet, *Curtiss* 1002, May, 1882; *Vesterland*, in 1889; Vasey, in 1892; near Eustis, Lake County, *Nash* 545, April 15–30, 1894, and May 28 to June 15, 1895; near Jacksonville, *Curtiss* 5414 June 6, 1[illegible].

Extremely variable in foliage.

5. **Eryngium prostratum** Nutt. DC. Prodr. **4**: 92. 1830.

Prostrate, rooting at the joints, diffusely branched; lower leaves long-petioled, oblong, entire, few-toothed, or lobed at base; upper leaves smaller, clustered at the rooting joints, ovate, few-toothed or entire, with some additional trifid ones; heads narrowly oblong (about 6 mm. long), with involucre of reflexed lanceolate bracts longer than the heads, and very small bractlets; fruit with scattered tubercles 1 mm. long.

Type locality, "in Americae bor. territorio Arkansano;" collected by *Nuttall*.

Wet places from Georgia and Florida to eastern Texas, Indian Territory, Missouri, and Kentucky.

Specimens examined:

MISSISSIPPI: Meridian, *Tracy*, June 6, 1881.

TENNESSEE: Chester County, *Bain*, August, 1892.

MISSOURI: Texas County, *Tracy*, July 3, 1886.

TEXAS: Hempstead, *Hall* 242, June 2, 1872; *Thurow* 6, in 1889.

ARKANSAS: Fort Smith, *Bigelow*, in 1853–54; Little Rock, *Letterman*, in 1881; same station, *Coville* 20, July 8, 1887.

INDIAN TERRITORY: Sapula, *Bush* 193, September 21, 1894.

For discussion of *E. americanum* Walter and *E. integrifolium* Walter, see C. & R. Rev. N. Am. Umbell. 102, and Jour. Bot. **38**: 244. 1900.

6. **Eryngium phyteumae** Delar. Eryng. 51. pl. 21. 1808.

E. discolor Watson, Proc. Am. Acad. **18**: 193. 1883.

Stem erect, slender, 3 to 6 dm. high, bearing a single head (rarely more); basal leaves on very long petioles, oblong to narrowly oblanceolate, thin, slightly crenate; stem leaves few, sessile, linear-lanceolate, acutely or spinosely toothed; head ovate-oblong (about 12 mm. long), with involucre of numerous linear-lanceolate spinose-tipped bracts (white within and green without) longer than the heads and entire or sparingly spinose-toothed, and a conspicuous terminal tuft of exserted bractlets resembling the bracts; ordinary bractlets narrow, with a long spinose acumination; fruit with ovate abruptly cuspidate-tipped calyx lobes and long slender styles.

Type locality, "Nova Hispania," near Toluca, State of Mexico; collected by *Humboldt & Bonpland.*

From the mountains of southern Arizona southward into Mexico.

Specimens examined:

ARIZONA: In water, Cienega, Huachuca Mountains, *Lemmon* 2714, September, 1882.

7. **Eryngium floridanum** C. & R. Bot. Gaz. **13**: 142. 1888.

Erect, 6 to 9 dm. high; basal leaves narrowly oblong (2.5 to 10 cm. long), mostly entire, on long-jointed petioles (sometimes 3 dm. long); upper leaves becoming sessile, elongated-linear, usually remotely serrulate; bracts linear-lanceolate, rigid, sharp-pointed, entire or spiny-toothed, reflexed, longer than the subglobose heads; bractlets linear, rigid, entire, tapering to a pungent tip, much longer than the flowers; fruit with short ovate acute calyx-lobes and very long rigid styles.

Type locality, "brackish marshes [near Jacksonville], Florida;" collected by *Curtiss*; type in U. S. Nat. Herb.

Brackish marshes of Florida.

Specimens examined:

FLORIDA: East Florida, *Palmer* 192, in 1874; near Jacksonville, *Curtiss* 998*, 999; same station, *Curtiss*, in 1875; near Tampa, *Garber*, May, 1876; near Jacksonville, *Curtiss* 4337, August 14, 1893.

8. **Eryngium aquaticum** L. Sp. Pl. **1**:232. 1753.

E. virginianum Lam. Encycl. **4**:759. 1796 (*fide* Britten & Baker, Jour. Bot. **38**: 243. 1900.)

E. praecultum Gray, Bost. Jour. Nat. Hist. **6**:210. 1850. (Pl. Lindh.)

Slender, 3 to 9 dm. high, branching above; basal and lower cauline leaves linear to oblong-lanceolate (petioles sometimes 3 dm. long), entire or with remote small hooked teeth; upper cauline leaves sessile, spiny-toothed or laciniate; heads ovate-oblong (12 mm. long), with lanceolate spiny-toothed or entire reflexed bracts mostly as long as the head or longer, and bractlets with 3 spiny cusps, the middle one largest; fruit scaly, with prominent lanceolate acuminate-cuspidate calyx-lobes equaling or exceeding the bractlets.

Type locality, "Virginia."

Wet places, New Jersey to Florida, and west to Texas.

Specimens examined:

New Jersey: Toms River, *Hollick*, August 15, 1885; Salem County, *Holmes*, September 9, 1890.

Delaware: Ellendale, *Canby*, September 16, 1891.

Maryland: Curtis Creek, *Taylor*, September 16, 1891.

District of Columbia: Eastern Branch, *Vasey*, in 1878.

Virginia: Alexandria, *Vasey*, in 1874 and 1875; Cape Charles City, *Canby & Rose* 821, September 25, 1894.

North Carolina: *McCarthy*, in 1884; near Wilmington, *Dewey*, in 1900.

South Carolina: Copper River swamp, *Ravenel* (type of *E. praecultum*); Bluffton, *Mellichamp* (representing *E. praecultum*).

We have been able to discover no difference between *E. virginianum* and *E. praecultum* Gray, the latter having been established upon unusually stout and broad-leaved forms from the swamps of South Carolina.

9. **Eryngium ravenelli** Gray, Bost. Jour. Nat. Hist. **3**: 209. 1850. (Pl. Lindh.)

Slender, from 4.5 to 9 dm. high, branching above; leaves linear, elongated, nearly terete (conduplicate), obscurely denticulate, the lower ones from 3 to 4.5 dm. long; heads as in *E. mettaueri*, with lanceolate spiny-toothed or entire reflexed bracts as long as the head, and bractlets with 3 strong and equal spiny cusps; fruit with short-mucronate calyx-lobes, and long rigid styles.

Type locality, "in flat and damp pine land, Black Oak, St. Johns, Berkeley district, South Carolina;" collected by *Ravenel*; type in Herb. Gray.

Wet pine barrens, South Carolina and Florida.

Specimens examined:

South Carolina: Near Aiken, *Ravenel*, in 1849 and 1869.

Florida: *Chapman* (described as *E. virginianum*); St. Marks, Wakulla County, *Nash* 2537, September 3, 1895.

10. **Eryngium mettaueri** Wood, Class-book, ed. 2, 379. 1860.

Stem erect, simple, 12 to 18 dm. high, branching at top; stem leaves linear to linear-lanceolate, entire or sparingly spinose-toothed at base,

the lower linear (sometimes 3 to 6 dm. long), on very long jointed petioles; heads ovate-oblong (12 mm. long), with numerous reflexed linear-lanceolate spinose-tipped and toothed bracts (whitish within and greenish without) larger than the heads, and lanceolate bractlets with 3 strong and equal spiny cusps (as in *E. ravenelii*); fruit about 2 mm. long, with ovate acute calyx-teeth, and long stout rigid styles.

Type locality, "in wet places, Newport, Florida;" collected by *Mettauer*. Found but once in the type locality.

We have not reexamined this species since our former revision.

11. **Eryngium integrifolium** Walter, Fl. Car. 112. 1788.

E. virgatum Lam. Encycl. **4**: 757. 1796.
E. americanum Sprengel in Roem. & Schult. Syst. **6**: 337. 1820.

Erect, 3 to 9 dm. high, branching above; leaves oblong or oblong-ovate, often subcordate, on short petioles; basal ones entire or crenately toothed; upper ones becoming sharply serrate or even laciniately toothed; bracts linear and entire or with 2 to 4 prickly teeth, longer than the subglobose heads; bractlets equally 3-cuspidate, little longer than the flowers; fruit with lanceolate acuminate calyx-lobes and long rigid styles.

Type locality not given, but presumably in the Carolinas; type in Herb. British Museum.

Damp pine barrens, from North Carolina to Florida, and westward to Louisiana and Texas.

Specimens examined:

North Carolina: Statesville, *Hyams*, July, 1879; Great Smoky Mountains, Swain County, altitude 570 meters, *Beardslee & Kofoid*, August 28, 1891; near Biltmore, *Biltmore Herb.* 2357*b*, August 12, 1897.

Florida: Apalachicola, *Chapman;* Walton County, *Curtiss* 1000, September; Wakulla County and Gadsden County, *Nash* 2539, 2573, September 3–5, 1895; near McClenny, *Curtiss* 6008, September 23, 1897.

Alabama: Near Mobile, *Harvey;* same station, *Mohr*, July, 1879; Spring Hill, *Bush* 351, August 25, 1897.

Mississippi: Ocean Springs, *Tracy*, August 8, 1889; Scranton, Jackson County, *Pollard* 1203, August 5–6, 1896; Biloxi, *Tracy* 4479, August 23, 1898.

Texas: Near Texarkana, Bowie County, *A. A. & E. Gertrude Heller* 4089, August 12, 1898.

In our Revision of 1888 (p. 102), under *E. prostratum* we discussed the standing of *E. americanum*, referred to Walter by Sprengel, and of *E. integrifolium* Walter. As then stated, there is no *E. americanum* Walter, Sprengel having copied under that name the description of *E. integrifolium* Walter. It has now been discovered by Mr. James Britten and Mr. E. G. Baker, of the British Museum, who have examined the type of *E. integrifolium* Walter, that it is identical with *E. virgatum* Lam.

Eryngium integrifolium ludovicianum (Morong) C. & R.

E. ludovicianum Morong, Bull. Torr. Bot. Club **14**: 51. 1887.
E. virgatum ludovicianum Morong in C. & R. Rev. N. Am. Umbell. 96. 1888.

Leaves linear-lanceolate, or sometimes linear.

Type locality, sandy barrens of "Natchitoches County, La.;" collected by *A. B. Langlois;* type in Herb. Columbia Univ.

Barrens of Georgia, to Louisiana and Texas.

Specimens examined:

GEORGIA: Irby, *Tracy* 1492, July 28, 1890; Poulan, Worth County, *Pollard & Mason* 547, August 14, 1900.

12. **Eryngium hookeri** Walp. Repert. **2**: 389. 1843.

E. coronatum Torr. & Gray, Fl. **1**: 604. 1840, not Hook. & Arn.

Stem erect, branching above, 3 to 6 dm. high; basal leaves petioled, somewhat dentate; lower stem leaves almost sessile, lanceolate, laciniately toothed and spinulose, with a pair of small laciniate segments at base; upper leaves palmately 5 to 7-parted, with narrow pinnatifid-laciniate spinose-tipped segments; heads ovate-oblong (8 to 12 mm. long); involucre of numerous narrowly lanceolate spinny-toothed bracts longer than the head; bractlets lanceolate, entire, spiny at tip, 1 or 2 of the terminal ones often elongated and conspicuously exceeding the head; fruit scaly, 1 mm. long, with ovate spiny-tipped calyx-lobes, and short styles.

Type locality, "Texas;" collected by *Drummond.*

Low grounds, Texas.

Specimens examined:

TEXAS: Matagorda County, *Bechdolt;* swampy prairies near Dallas, *Reverchon* 357, July, 1879 and 1880; Harris and Navarro counties, *Joor;* prairies, *Pammel*, July, 1888.

13. **Eryngium aromaticum** Baldwin in Elliott's Sketch **1**: 344. 1821.

Stems decumbent or erect, several from one root, simple to near the summit, very leafy, 3 to 6 dm. high; leaves pinnately parted, with entire segments and cartilaginous margins; the 3 upper segments remote and broader, cuspidate; the lower ones scattered and setaceous; heads globose, 6 to 10 mm. long, with 3-cleft bracts longer than the head, and 3-toothed bractlets; fruit tuberculate, 1 mm. long, with setaceous calyx teeth 2 mm. long, and long styles; oil tubes large; seed flattened dorsally, with plane face.

Type locality, "dry pine barrens, Florida."

Pine barrens of Florida and Alabama.

Specimens examined:

FLORIDA: Caloosahatchee, *Chapman;* near Jacksonville, *Curtiss* 1001; St. Augustine, *Mary Reynolds*, September, 1875; Tocoi, *Garber*, July, 1876; Manatee, *Garber*, September, 1877; East Florida, *Palmer* 191, in 1874; Manatee, *Simpson*, in 1889; near Jacksonville, *Curtiss* 4335, 5215, September, 1893 and 1894; Lake City, *Nash* 2491, August 29–31, 1895.

14. **Eryngium diffusum** Torr. Ann. Lyc. N. Y. **2**: 206. 1828.

Usually low and diffusely branching from the base, varying from 2 to 40 cm. in height; leaves sessile, palmately parted, coriaceous, midrib very prominent beneath and margins cartilaginous; segments

oblong, incisely serrate and spinose; heads subglobose, about 12 mm. long, on very short peduncles or sessile; involucre of bracts resembling the leaves, longer than the head; bractlets lanceolate, entire, spinosely tipped; fruit clothed with imbricated pointed scales, less than 2 mm. long, with ovate long-pointed calyx lobes twice as long, and long styles; oil tubes very large, more or less sunken in the somewhat dorsally flattened seed; seed face plane.

Type locality, "on the Canadian," Arkansas; collected by *James* in 1820; type in Herb. Columbia Univ.

ILLUST.: Marcy's Report, pl. 6.

Sandy plains, Arkansas, Oklahoma, Indian Territory, and Texas.

Specimens examined:

OKLAHOMA: Cheyenne County, *Carleton* 454, August, 1891.

INDIAN TERRITORY: Near Cash Creek, *Sheldon* 169, July 17, 1891.

TEXAS: Nueces River, *Berlandier* 2508, June, 1834; Baylor County, *Reverchon* 356, September, 1879; Colorado River, *Havard*, August, 1881; Baird, *Letterman* 51, August, 1882; *Nealley*, in 1888; Gillespie County, *Jermy* 643, 644.

15. **Eryngium wrightii** Gray, Pl. Wright. **1**: 78. 1852.

Glaucous; stem erect, branching, 3 to 6 dm. high; leaves rigid; basal and lower stem leaves oblanceolate, pectinate-dentate or pinnatifid with triangular teeth tipped with long bristles; stem leaves sessile, from laciniately toothed to pinnately cut into linear-lanceolate cuspidate segments; heads ovate to oblong, about 12 mm. long; involucre of numerous linear-lanceolate entire to remotely toothed spiny-tipped bracts, whitish within, green without, twice as long as the head; bractlets subulate, rigid, spiny-tipped, longer than the flowers, the terminal one or two very prominent and crowning the head; fruit 1 mm. long, with short ovate mucronate calyx lobes, and long styles.

Type locality, "bed of the Limpia or Wild Rose Creek," Texas; collected by *Wright*, no. 230, in 1849; type in Herb. Gray, duplicate in U. S. Nat. Herb.

Hills and plains, Texas to Arizona, and extending into Mexico.

Specimens examined:

TEXAS: *Wright* 230, August, 1849; *Mex. Bound. Surv.* 412; near Dallas, *Hall* 243, June 30, 1872; western Texas, *Havard*, July, 1883; Chenates region, *Nealley* 169, in 1889.

ARIZONA: Sonoita Valley, altitude 1,950 meters, *Rothrock* 603, August, 1874; Apache Pass, Chiricahua Mountains, *Lemmon*, August, 1881; northern Arizona, *Lemmon* 18, in 1882; near Fort Huachuca, *Wilcox* 365, August, 1894.

16. **Eryngium lemmoni** C. & R. Bot. Gaz. **14**: 279. 1889.

Glaucous; stem erect, branching above, 3 to 9 dm. high; basal and lower stem leaves rigid, elongated oblanceolate, sharply dentate; uppermost leaves broadly ovate, more or less deeply cut, the lobes cuspidate-tipped; heads short-oblong (8 to 12 mm. long), much surpassed and enveloped by the conspicuous involucre of broadly cuneate leaf-like cuspidate-toothed and lobed bracts (becoming 8 to 10 mm. broad);

bractlets scarcely exceeding the flowers and rather weak, the terminal ones not all prominent; fruit with short ovate cuspidate-tipped sepals, and long slender styles.

Type locality, "Chirricahua Mountains, southeastern Arizona;" collected by *Lemmon*, no. 17, in 1881; type in U. S. Nat. Herb.

Mountains of southeastern Arizona and extending into Mexico.

Specimens examined:

ARIZONA: Type specimens as cited under type locality.

17. **Eryngium leavenworthii** Torr. & Gray, Fl. **1**: 604. 1840.

Stout, 3 to 9 dm. high, branching above, the upper leaves and heads often purplish; lowest stem leaves broadly oblanceolate, spinosely-toothed, gradually becoming more or less palmately parted above to the ordinary stem leaves, which are sessile and deeply palmately parted into narrow incisely pinnatifid spreading pungent segments; heads pedunculate, ovate-oblong, 2.5 to 3.5 cm. long; involucre of incisely pinnatifid spinose bracts about as long as the head; bractlets narrow, 3 to 7-cuspidate, the terminal ones very prominent, resembling the bracts and crowning the head; fruit 2 mm. long, with oblong pinnatifid 3 to 5 cuspidate sepals more than twice as long as the fruit, and short rigid styles; oil tubes large; seed flattened laterally.

Type locality, "Red River, Arkansas;" collected by *Leavenworth*; type in Herb. Gray.

Dry soil, Kansas, Arkansas, Oklahoma, Indian Territory, and Texas.

Specimens examined:

KANSAS: Junction City, *M. H. Panton;* Bourbon County, *Hall*, in 1869.

INDIAN TERRITORY: *Palmer* 146, in 1868.

OKLAHOMA: Pawnee, *Blankinship*, August 30, 1895.

TEXAS: *Wright*, in 1849 and 1852; *Mex. Bound. Surv.* 411; Fort Worth, *L. F. Ward*, September 9, 1877; same station, *Havard;* Concho, *Havard*, July, 1881; Gillespie County, *Jermy* 717; Sherman, *Mrs. M. L. Nash*, in 1888 and 1893; Ballinger, *Nealley* 379, August 1889.

18. **Eryngium armatum** (Watson) C. & R. Bot. Gaz. **13**: 141. 1888.

E. petiolatum armatum Watson, Bot. Calif. **1**: 255. 1876.

Diffuse, branching throughout, 1.5 to 3 dm. high, or even 5 to 6 dm.; basal leaves oblanceolate (sometimes broadly so), from serrate to spinose-dentate, attenuate into a short more or less margined petiole; stem-leaves narrower and sessile; heads sessile or short-peduncled, globose (about 12 mm. in diameter), with involucre of triangular-lanceolate (broader at base) entire rigid callous-margined spreading bracts (10 to 15 mm. long) much longer than the head; bractlets the same and fully as prominent; fruit with ovate-lanceolate acuminate calyx lobes longer than the short styles.

Type locality not given.

Central California, apparently in low ground.

Specimens examined:

CALIFORNIA: Moist places, near Mendocino, Mendocino County, *Pringle*, August 5, 1882; Chico, Butte County, *Mrs. R. M. Austin*, in 1883; Antioch, Contra Costa County, *M. K. Curran*, May, 1884; Adeline Station, *Bioletti*, in 1891; Crystal Springs, San Mateo County, *Alice Eastwood*, May, 1896.

19. **Eryngium articulatum** Hook. Lond. Jour. Bot. **6**: 232. 1847.

E. harknessii Curran, Bull. Calif. Acad. Sci. **1**: 153. 1885.

Erect, 3 to 7 dm. high, dichotomously branching above, usually with a pedunculate head in the forks; basal and lower stem leaves reduced to very long (7.5 to 25 cm.) nodose petioles, with or without a small lanceolate nearly parallel-veined blade (from entire to spinulose-serrate); upper stem leaves sessile and opposite, sometimes more or less laciniate at base; heads globose to short oblong, more or less purplish or blue; bracts lanceolate, cuspidate tipped, spiny-toothed below, 12 to 18 mm. long, as long as the heads or longer; bractlets tricuspidate (sometimes with a pair of small accessory teeth below), the middle one much the largest, longer than the sepals; fruit with lanceolate cuspidate-acuminate calyx lobes 4 to 5 mm. long.

Type locality, "stony edges of the Spokane River, and Skitsoë and Cœur d'Alene lakes," Idaho; collected by *Geyer*, no. 583, August and September, 1843–44; type in Herb. Brit. Mus., duplicate in Herb. Gray.

From northern Idaho, through Washington and Oregon, to central California.

Specimens examined:

IDAHO: Shores of Lake Cœur d'Alene, altitude 640 meters, *Leiberg* 543, August 15, 1895; moist ground near Moscow, *Henderson*, in 1894.

WASHINGTON: Olympia, *Henderson* 2518, 2519; near Pullman, Whitman County, *Piper* 1559, August 12, 1893.

OREGON: Rogue River Valley, *Wilkes' Exped.* 1187; same station, *Howell*, July 15, 1887; Woodville, Jackson County, *Howell* 734, August 18, 1888; Aspen Lake, near Klamath Lake, *Applegate* 464, July 23, 1895.

CALIFORNIA: Suisun Marsh, Solano County, *Harkness*, July, 1885; near Mount Shasta, *Miller*, July, 1886; Suisun Marsh, *Greene*, September 29, 1884; Goose Lake Valley, *Mrs. R. M. Austin*, August, 1895.

The discovery of *E. articulatum* in its type locality has enabled us to clear up the confusion that has arisen in reference to this species, which has become a perplexing aggregate. Leiberg's specimens seem to be exact duplicates of those of Geyer. It is evident that the numerous later collections that have been named *E. articulatum* have been wrongly referred, and must be looked for elsewhere. In connection with the original description Hooker publishes a field note of Geyer, which describes the habit of the plant so well that we quote it as follows:

"In April the young plants are wholly submerged, and present the appearance of some articulated *Juncus*, the leaves, or rather the petioles, being similarly terete and jointed. On emerging above the water these petioles expand into laminæ at the top, retaining the jointed swollen character in the costa. The radical petioles are 8 to 10 inches long. Those of the stem, in proportion as they are out of the water, become flattened and the margin spinuloso-ciliate."

20. **Eryngium petiolatum** Hook. Fl. Bor. Am. **1**: 259. 1834.

E. petiolatum juncifolium Gray, Proc. Am. Acad. **8**: 385. 1872.

Erect and slender, 3 to 4 dm. high, branching above; basal and lower stem leaves reduced to long nodose petioles, with or without small narrowly lanceolate blades, which are nearly parallel veined and from remotely spinulose to spinulose-serrate; upper stem leaves narrow, opposite, attenuate below, spinulose-serrate above, spinulose at base; heads short-peduncled, globose, small (about 8 mm. in diameter); bracts and bractlets subulate, ciliate-spinose, rigid, at least twice as long as the head, and making it quite spinose; fruit with lanceolate cuspidate-acuminate sepals longer than the styles.

Type locality, "Moist soils on the plains of the Multnomak [probably Multnomah] River," Oregon; collected by *Douglas;* type in Herb. Brit. Mus.

Wet ground, western Oregon.

Specimens examined:

OREGON: "Near the Umpqua River," *Wilkes Exped.* 1156; wet places in prairies, near Salem, Marion County, *Hall* 200, in 1871 (type of *E. petiolatum juncifolium* Gray); "swales, western Oregon," *Howell*, August, 1880; Hood River, Wasco County, *Henderson* 369, August 5, 1884; Willamette Valley, *Howell* 30, August, 1886; near Medford, *Howell*, July, 1887; near Kerbyville, *Howell* 30A, July, 1887.

Hooker described this species from "one, and that an imperfect specimen," but at the same time it is an unmistakable diagnosis. Later authors confused it with *E. articulatum*, and Gray merged the two under the name *E. petiolatum*. From that time the specimens of *E. articulatum* stood for *E. petiolatum*, and when specimens of true *E. petiolatum* came to hand in the collections of Hall, and from near the type locality, Gray described them as *E. petiolatum juncifolium*. This is, of course, not the *E. petiolatum* of our former revision.

21. **Eryngium elongatum** C. & R., sp. nov.

Erect, 3 to 4 dm. high, somewhat branching above; basal leaves elongated, oblanceolate, 3 dm. long, spinulose-serrate, abruptly acuminate, gradually tapering below into spinulose-winged petioles; upper leaves similar, but much smaller; heads on short stout peduncles, nearly globose, about 15 mm. long; bracts broadly linear, somewhat weak and becoming reflexed, much longer than the heads, becoming 25 mm. long, spinose-bristly except toward the tip, more or less scarious margined at base; bractlets narrow and rigid, a little longer than the flowers, with conspicuous scarious margin below (broader at base), usually without bristles; sepals ovate, scarious-margined, 2 mm. long, with an abruptly cuspidate-bristly tip; styles longer than the sepals.

Type locality, near San Francisco, Cal.; collected by *G. R. Vasey*, in 1875; type in U. S. Nat. Herb.

In the Bay region of California.

Specimens examined:

CALIFORNIA: The type as cited.

A somewhat immature specimen collected by *Jepson*, May 23, 1897, at "Wells Hill, Upper Vaca Valley, Napa River Basin," may belong here, but it has narrower and less spinulose leaves and smaller heads and bracts.

22. **Eryngium jepsoni** C. & R., sp. nov.

Erect, 3 to 6 dm. high, from almost simple to much branching; basal leaves narrowly oblanceolate, tapering into long petioles, spinose-toothed and sometimes with a few narrow segments; upper leaves opposite, short-petioled or sessile; heads on very short peduncles, nearly globose, about 6 mm. long; bracts very narrow and rigid, much longer than the heads, 8 to 20 mm. long, the lowest third with spinose bristles, hardly scarious-margined at base; bractlets narrowly linear-lanceolate, a little longer than the flowers, with conspicuous scarious margin below (broadening upward to an acuminate tip or lobe on each side), at the top of which and just above are a few bristles; sepals oblong, scarious-margined, 2 mm. long, with an abruptly cuspidate-bristly tip about one-third as long; styles longer than the sepals.

Type locality, near Orinda Park, Contra Costa County, Cal.; collected by *W. L. Jepson* in 1895; type in U. S. Nat. Herb.

In the Bay Region of California, Contra Costa County.

Specimens examined:

CALIFORNIA: *Wright*, in 1853–56; Contra Costa County, *G. R. Vasey* 223, July, 1880; near Orinda Park, Contra Costa County, *Jepson*, September 1, 1895.

23. **Eryngium minimum** C. & R.

E. petiolatum minimum C. & R. Rev. N. Am. Umbell. 98. 1888.
E. articulatum microcephalum C. & R. l. c. 99.

Low, 1 to 3 dm. high or even less, leaves and the few nearly simple stems clustered at base; basal leaves narrow, with more or less elongated petioles, from simple and spinosely-toothed to pinnately-segmented; the segments from toothed to lacerate or pinnately-parted, more or less distant below and represented on the petiole by spinous processes; heads on very short peduncles, nearly globose, about 6 mm. long; bracts linear-lanceolate, as long as the heads or a little longer, 6 to 10 mm. long, the lower two-thirds with spinose bristles, hardly scarious-margined at base; bractlets linear, a little longer than the flowers, with conspicuous scarious margin below (broadening downward), at the top of which and just above are a few bristles; sepals ovate, scarious-margined, 1 mm. long, with an abruptly cuspidate-bristly tip about as long; styles longer than the sepals.

Type locality, "Donner Lake," California; collected by *C. F. Sonne*.

In the Sierra Nevada of northeastern California.

Specimens examined:

CALIFORNIA: "Sierra Nevada Mountains," *Lemmon*, in 1875; Plumas County, *Mrs. R. M. Austin*, in 1878 (type of *E. articulatum microcephalum* C. & R.); dry meadow at Donner Lake, Nevada County, *Sonne*, August 1892.

We have not been able to reexamine the type of *E. minimum*, and therefore can not refer *E. articulatum microcephalum* to it with certainty. An examination of specimens from the type locality of *E. minimum*, however, together with a reexamination of the type of *E. articulatum microcephalum*, seem to justify this tentative reference, although the sepals of the latter are somewhat different, and the heads have a decidedly bluish tint.

24. **Eryngium alismaefolium** Greene, Erythea 3: 64. 1895.

The numerous leaves and stems clustered at base and arising from a fascicle of coarse roots; stems diffusely branching, at first much shorter than the leaves, later often exceeding them; basal leaves elongated, sometimes 3 dm. long, the long more or less nodose petioles (nodose ones terete and not spinose, the others flat and spinose) with or without spinosely serrate or somewhat laciniate oblanceolate blades; upper leaves similar, but much smaller; heads usually on short peduncles, nearly globose, 9 to 10 mm. high; bracts subulate-lanceolate, usually somewhat longer than the heads, 10 to 12 mm. long, with or without a few spinose bristles, somewhat scarious-margined at base; bractlets subulate-lanceolate, a little exceeding the flowers, with conspicuous scarious margin below (broadening downward), with or without a few bristles; sepals ovate-oblong, scarious-margined, 1 mm. long, tapering into a cuspidate-bristly tip; styles longer than the sepals.

Type locality, "Egg Lake, Modoc County, Cal.;" collected by *Baker & Nutting*, August 25, 1894; type in Herb. Univ. Calif.!

Northeastern California and eastern Oregon.

Specimens examined:

CALIFORNIA: Mountain meadows, Lassen County, *Mrs. R. M. Austin*, August, 1880; Lassen Buttes, Plumas County, altitude 1,800 meters, *Brown* 612, August 1–15, 1897.

OREGON: Near Silver Lake, Lake County, altitude 1,590 meters, *Leiberg* 753, August 19, 1894; near Button Springs, Lake County, altitude 1,470 meters, *Leiberg* 790, August 23, 1894; Grand Ronde Valley, *Cusick* 2117, September 3, 1898.

25. **Eryngium longistylum** C. & R., sp. nov.

Low, 1 to 2 dm. high, from a fascicle of thick roots, branching throughout and spreading; basal leaves narrow, pinnately cut into distant almost spine-like segments; heads nearly sessile, globose, about 4 mm. long; bracts narrowly lanceolate, spreading as in *E. armatum*, much longer than the heads, 6 to 8 mm. long, mostly entire, slightly scarious-margined at base; bractlets similar, but somewhat puberulent, narrower, and with broader scarious margins at base; sepals lanceolate, scarious-margined, 1 mm. long, tapering above into a weak acuminate tip; styles very much longer than the sepals.

Type locality, San Simeon, San Luis Obispo County, Cal.; collected by *M. K. Curran*, June, 1888; type in Herb. Coulter.

The type is the only specimen seen.

26. **Eryngium oblanceolatum** C. & R., sp. nov.

Erect and tall, 3 to 6 dm. high, dichotomously branching; basal leaves oblanceolate, tapering into long petioles, from spinosely serrate to cleft, the teeth or small segments continuing down the petiole; heads on very short peduncles, nearly globose, about 6 mm. long; bracts very narrow and rigid, much longer than the heads, 18 to 20 mm. long, the lowest third with spinose bristles, conspicuously scarious-margined at base; bractlets very narrow and rigid, much longer than the flowers, about the size of the bracts, with conspicuous scarious margin below (broadening upward to a lobe on each side), at the top of which and sometimes above are a few bristles; sepals ovate, scarious-margined, 1.5 mm. long, tapering above into a short apiculation; styles longer than the sepals.

Type locality, Sonoma Valley, California; collected by *Dr. J. Torrey*, no. 159, in 1865; type in U. S. Nat. Herb.

In the valleys of the bay region of California.

Specimens examined:

CALIFORNIA: Sonoma Valley, Sonoma County, *Torrey* 159, in 1865; Napa Valley, Napa County, *Jepson*, June 2, 1896; Madrone, Santa Clara County, *Jepson*, June, 1896.

27. **Eryngium aristulatum** Jepson, Erythea **1**: 62. 1893.

Prostrate, very slender, the stems 2.5 to 4 dm. in length; basal leaves tapering into a long petiole, 1 dm. long (including the petiole), the short blade spinose-toothed and with a few lanceolate segments; stem leaves opposite, sessile, spinulose-serrate; heads very numerous, 6 mm. long; bracts exceeding the head, about 10 mm. long, densely spinescent at base; bractlets spinose, the body narrowly lanceolate, inversely sagittate-winged from the base upward, the lobes of the wings thus forming sinuses, in each of which are borne 1 to 3 awns surpassing the breadth of the wing; calyx-lobes ovate-lanceolate, hyaline-margined, 2 mm. long, tapering into a cuspidate-bristly tip exceeded by the long styles.

Type locality, "in the dry bed of a winter lake situated in the mountains south of Uncle Sam Mountain, Lake County, California;" collected by *W. L. Jepson*, July 28, 1892; type in Herb. Univ. Calif.

Mountains of northeastern California.

Specimens examined:

CALIFORNIA: Type specimens as cited under type locality.

28. **Eryngium vaseyi** C. & R. Bot. Gaz. **13**: 142. 1888.

Stems 2.5 to 4 dm. high, several from a common root and diffusely branching; leaves oblanceolate, unequally spinulose-serrate, attenuate below; bracts and bractlets similar, narrow, thick and rigid, spinose and spiny-toothed, divergent, 12 to 15 mm. long, forming a spinose burr-like head; fruit with ovate-oblanceolate cuspidate-acuminate calyx-lobes shorter than the styles.

Type locality, "in wet ground, San Antonio River (Monterey County), California;" collected by *G. R. Vasey*, no. 222, July 1880; type in Herb. Canby (now in College of Pharmacy, New York City).

Apparently at low levels, central California.

Specimens examined:

CALIFORNIA: Type specimens as cited under type locality, *Lemmon;* Chico, Butte County, *Mrs. R. M. Austin*, in 1883; Wilson Creek, near Vacaville, Sonoma County, *Jepson*, September 30, 1893; near Elmira, Solano County, *Jepson*, June 13, 1893; near Escalon and Burnet, lower San Joaquin, Santa Clara County, *Jepson*, July, 1896.

29. **Eryngium parishii** C. & R., sp. nov.

Low, much branched at base, the slender stems erect or spreading, 1 to 4 dm. long; basal leaves from simple to pinnate, the blades or segments from laciniate-toothed to cleft, tapering into a long more or less spinosely-toothed petiole; inflorescence beginning near the base and diffusely branching, the heads on very short peduncles, nearly globose, about 6 mm. long; bracts very narrow and rigid, longer than the heads, 12 to 18 mm. long, with a few spinose bristles at base and not at all scarious-margined; bractlets very narrow and rigid, much longer than the flowers, about the size of the bracts, with short scarious margin below (broadening upward to a short lobe on each side), at the top of which and just above there may or may not be a few bristles, the margined base inclosing the fruit and falling off with it; sepals ovate, scarious-margined, 1.5 mm. long, tapering above into a cuspidate-bristly tip; styles longer than the sepals.

Type locality, Oceanside, San Diego County, Cal.; collected by *S. B. Parish*, no. 4436, in 1897; type in U. S. Nat. Herb.

Sandy ground, southern California and extending into Lower California.

Specimens examined:

CALIFORNIA: Mesas near San Diego, *Orcutt*, June, 1882 and 1889; San Luis Obispo County, *Lemmon* 61, June, 1887; Oceanside, San Diego County, altitude 0 to 15 meters, *Parish* 4436, June 11–16, 1897.

The following forms are doubtful because of immaturity or insufficiency of material, and we do not venture to characterize them fully or to name them, but they seem sufficiently distinct to mention, and may prove to be new species. They all belong to the group with long styles, and bractlets conspicuously scarious-winged below.

A specimen collected by *M. E. Jones*, no. 3602, near Auburn, Placer County, Cal., July 8, 1882, has conspicuously spinose-bristly bracts and bractlets much exceeding the head, but the flowers are in bud and basal leaves are lacking. The station of the specimen is also quite distinct from that of the species it most resembles.

A specimen collected by *George Hansen*, no. 391, near Pinegrove, Amador County, Cal., at an altitude of 560 meters, June 17, 1893, is a low plant, with basal leaves pinnately cut into distant almost spine-like segments.

A specimen collected by *Brandegee*, June 3, 1889, at Alpine Station, San Diego County, Cal., differs from the coast forms with which it is allied, not only in its very different elevation, but also in its much more prominent bracts. It may belong to some of the coast species, but as we have seen only the heads, which seem to suggest a difference, we do not venture at present to assign it to any of them.

A specimen in Professor Greene's herbarium, collected by *Michener & Bioletti* at "San Joaquin Bridge," San Joaquin County, September, 1892, is unlike any species we have seen, but is too immature to characterize definitely. It is very slender and spreading, from a fascicle of thick roots; basal leaves reduced to nodose petioles 3dm. long or more; lower stem leaves similar, but shorter, and with very small lanceolate entire or somewhat spinosely-toothed blades; uppermost leaves sessile and bristly-toothed and cleft; heads very small and scattered along the loose and elongated branching stem; bracts very narrow, much longer than the heads, sparsely bristly at base; bractlets scarious below; sepals ovate-lanceolate, scarious-margined, tapering into a cuspidate tip.

6. CHAEROPHYLLUM L. Sp. Pl. 1: 258. 1753.

Calyx teeth obsolete. Fruit flattened laterally, narrowly oblong to linear, rounded at base, with short beak or none. Carpel terete, with equal ribs, each with a large group of strengthening cells usually occupying the whole thickness of the thick pericarp. Stylopodium conical; styles very short. Oil tubes small, mostly solitary in the intervals, 2 on the commissural side. Seed face more or less deeply sulcate.

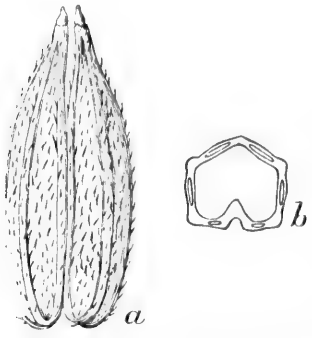


FIG. 6.—Chaerophyllum tainturieri dasycarpum: *a*, × 9; *b*, × 12.

Annuals, in moist ground, with ternately decompound leaves, pinnatifid leaflets with oblong obtuse lobes, usually no involucre, involucels of many bractlets, and white flowers.

First species cited, *C. sylvestre* L.

A group of about 40 species, extending from Europe to central Asia, probably three species occurring in the United States east of the Rocky Mountains.

In our former revision of the genus we were unable to separate *C. tainturieri* as a species from *C. procumbens*. Further study and more abundant material, however, have convinced us that they are probably to be separated by the characters of the fruiting umbel and of the fruit, as well as by the range. In all the forms mature fruit is very essential for determination.

Glabrous; fruit not beaked.

Fruiting umbels of 2 to 4 fruits on weak spreading pedicels..... 1. *C. procumbens.*

Fruiting umbels of 10 to 17 fruits, which are sessile or on stout pedicels, forming a compact cluster..... 2. *C. texanum.*

Pubescent; fruit beaked; fruiting umbels compact..... 3. *C. tainturieri.*

1. Chaerophyllum procumbens (L.) Crantz, Umbel. 77. 1767.

Scandix procumbens L. Sp. Pl. 1: 257. 1753.

Glabrous or nearly so; stems slender, spreading, 1.5 to 4.5 dm. high;

umbels sessile or pedunceled, few-rayed; rays 1 to 5 cm. long; fruiting umbel open, of 2 to 4 fruits on weak and usually spreading pedicels 4 to 9 mm. long; fruit narrowly oblong, about 8 mm. long, glabrous, narrowed but not beaked at apex; ribs filiform, much narrower than the broad intervals; styles very short; seed face deeply sulcate.

Type locality, "Virginia;" collected by *Gronovius*, no. 147.

From New York to Virginia, west to Michigan, Iowa, and Tennessee.

Specimens examined:

NEW YORK: Ithaca, *Kellerman*, May 28, 1874; same station, *Pearce*, May 26, 1884; same station, *Carlle*, May 27, 1885.

PENNSYLVANIA: York County, *Small*, May 2, 1891.

DELAWARE: *Canby*, May, 1874.

DISTRICT OF COLUMBIA: Rock Creek, *Ward;* Eastern Branch of Potomac, *Blanchard*, April 28, 1892.

TENNESSEE: Knox County, *Scribner*, April 13, 1889.

OHIO: Niles, *Ingraham*, May, 1891; Lorain County, *Ricksecker*, May 4, 1895.

MICHIGAN: Near Agricultural College, *Wheeler*, May 19, 1896.

ILLINOIS: Near Chicago, *Babcock*, May 13, 1874.

Two specimens, one collected by *Rowlee* near Ithaca, N. Y., May 19, 1888, the other by *Umbach* near Chicago, May 21, 1898, differ from the ordinary forms in the more prominent ribs, but the plants are distinctly of the *procumbens* type. The immature fruit and scanty material forbid any more definite reference.

Chaerophyllum procumbens shortii Torr. & Gr. Fl. **1**: 637. 1840.

Fruit more broadly oblong to ovate, about 6 mm. long, obtuse rather than narrowed at apex.

Type locality, "Kentucky;" collected by *Dr. Short*.

From Pennsylvania to Virginia and west to Kentucky.

Specimens examined:

MARYLAND: Glen Echo, *Pollard* 294, May 31, 1895.

VIRGINIA: Alexandria, *Rose*, May 24, 1890.

2. **Chaerophyllum texanum** C. & R., sp. nov.

Resembling *C. tainturieri*, but glabrous; fruiting umbels more dense, of 10 to 17 fruits; fruit smaller and not beaked, 4 to 5 mm. long, glabrous; ribs very prominent, almost obliterating the intervals.

Type locality, near Houston, Tex.; collected by *J. N. Rose*, no. 4173, May 6, 1899; type in U. S. Nat. Herb.

Eastern Texas.

Specimens examined:

TEXAS: *Hall; Reverchon;* Guadalupe Mountains, *Havard*, October 5, 1881; *Nealley*, in 1888; near Houston, *Rose* 4173, May 6, 1899.

3. **Chaerophyllum tainturieri** Hook. Comp. Bot. Mag. **1**: 47. 1835.

C. procumbens tainturieri C. & R. Bot. Gaz. **12**: 160. 1887.

Resembling *C. procumbens*, but pubescent and stouter; fruiting umbel more compact, of 7 or 8 fruits either sessile or on short stout erect or somewhat spreading pedicels sometimes reaching 6 mm. in

length; fruit linear-oblong, distinctly beaked, 6 to 7 mm. long, glabrous; ribs very prominent, broader than the intervals but not obliterating them; styles longer; seed face less deeply sulcate.

Type locality, "N. Orl." [New Orleans]; collected by *M. Tainturier*.

From Alabama and adjacent Tennessee to Texas.

Specimens examined:

TENNESSEE: Palmetto, *Montgomery*, May 8, 1894.

ALABAMA: Mobile, *Mohr*, April, 1879; Tuscaloosa, *L. F. Ward*, April 7, 1892.

MISSISSIPPI: Starkville, *Phares*, May, 1883; Jackson, *Phares*, April, 1886; Starkville, *Tracy* 1350, April 9, 1892.

TEXAS: Hempstead County, *Hall* 261, June 8, 1872; Industry, *Warslow*, May, 1895.

Specimens from near Suffolk, Nansemond County, Va., collected by *Britton & Small*, May 27, 1893, seem to resemble *C. tainturieri* in every particular except that they are glabrous. This fact, together with the distinct range, makes us hesitate to refer them here.

Chaerophyllum tainturieri dasycarpum (Nutt.) Watson, Bibl. Index 416. 1878. FIG. 6.

C. dasycarpum Nutt. in Torr. & Gray, Fl. **1**: 638. 1840.

C. procumbens dasycarpum C. & R. Bot. Gaz. **12**: 160. 1887.

Fruit pubescent, the intervals sometimes broader than the ribs.

Type locality not given; collected by *Nuttall;* type in Herb. Gray.

From Mississippi to eastern Texas.

Specimens examined:

MISSISSIPPI: Biloxi, *Tracy* 4469, March 3, 1888.

TEXAS: Hempstead County, *Hall* 260, June 12, 1872; near Dallas, *Reverchon* 362, May, 1876; Tom Green County, *Tweedy* 187, May, 1880; Gillespie County, *Jermy* 141, 249; San Diego, *Mary B. Croft*, in 1885; Nueces County, *Heller* 1521, April 3, 1894; near Houston, *Rose* 4189, May 6, 1899.

Chaerophyllum tainturieri floridanum C. & R., var. nov.

Fruit glabrous, but the prominent ribs somewhat narrower than the intervals.

Type locality, shell banks, Sister Islands, St. Johns River, Florida: collected by *A. H. Curtiss*, no. 1040, March, 1880; type in U. S. Nat. Herb.

Florida and South Carolina, and at a single station in Missouri.

Specimens examined:

FLORIDA: Near Jacksonville, *Curtiss* 1039, April, 1879; type as cited above; near Jacksonville, *Curtiss* 4339, 4653, April, 1893 and 1894.

SOUTH CAROLINA: Columbia, *Miss Crawford*, June, 1891.

MISSOURI: Eagle Rock, *Bush* 62, June 18, 1897.

For introduced species, see page 251.

7. **WASHINGTONIA** Raf. Am. Month. Mag. **2**:176. 1818.

Osmorhiza Raf. Am. Month. Mag. **2**: 176. 1818.

Glycosma Nutt. in Torr. & Gray, Fl. **1**: 639. 1840.

Myrrhis § *Glycosma* Gray, Proc. Am. Acad. **7**: 346. 1867.

Calyx teeth obsolete. Fruit linear to linear-oblong, more or less attenuate at base, obtuse, acute, or beaked at apex, glabrous or bristly

on the ribs. Carpel slightly flattened dorsally or not at all, often tapering into a long caudate attenuation at base, nearly pentagonal in section, with equal ribs, thin pericarp, and a well-defined group of strengthening cells beneath each rib. Stylopodium conical, sometimes depressed; styles mostly short. Oil tubes obsolete in mature fruit (often numerous in young fruit). Seed face from slightly concave to deeply sulcate.

Glabrous to hirsute perennials, from thick aromatic roots, 3 to 9 dm. high, with ternately decompound leaves, broad ovate to lanceolate variously toothed leaflets, involucre and involucels few-leaved or wanting, and white or purple flowers in few-rayed and few-fruited umbels.

Type species, *Myrrhis claytoni* Michx. Fl. **1**: 170. 1803.

A group of about 16 species, chiefly found in the United States and Canada, only 4 species occurring beyond our boundaries in Mexico, South America, and eastern Asia.

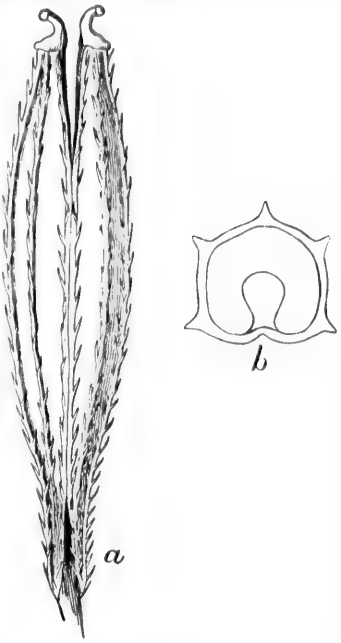


FIG. 7.—Washingtonia brachypoda: *a*, × 4; *b*, × 8.

The priority of the name *Washingtonia* rests upon the fact that it is mentiond before *Osmorhiza* in a list of three possible names suggested by Rafinesque for the new genus. In the same sentence he expresses a preference for *Osmorhiza*, and later formally establishes the genus under that name, by which it has been known ever since. It is under protest that we displace a name of such long use for what seems to be so trivial a reason, but the name *Washingtonia* will continue to be put forward in accordance with a technical interpretation of the law of priority.

In reexamining the claims of *Glycosma* Nutt. to generic rank we find no occasion to change the decision reached in our former Revision, to which (p. 117) we would refer for a full statement of the case. In his revision of the Umbelliferae for Engler and Prantl's *Nat. Pflanzenfamilien* Dr. Drude has reached the same conclusion.

OSMORHIZA.—Fruit with bristly ribs; carpel with long caudate attenuation (except *W. brachypoda*).

Involucels of several bractlets.
- Carpel with long attenuation; eastern species.
  - Style very short (less than 1 mm.) ..... 1. *W. claytoni.*
  - Style longer (2 mm. or more) ..... 2. *W. longistylis.*
- Carpel short attenuate at base; Californian species ..... 3. *W. brachypoda.*

Involucels none.
- Flowers white.
  - Fruit obtuse at apex.
    - Foliage strigose-pubescent; leaflets obtuse or acutish ..... 4. *W. nuda.*
    - Foliage almost glabrous; leaflets acute or acuminate ..... 5. *W. obtusa.*

Fruit beaked or constricted at apex.
Foliage almost glabrous.
Fruit with conspicuous sharp beak ..... 6. *W. divaricata.*
Fruit constricted below the apex and with truncate tip..... 7. *W. leibergi.*
Foliage strigose-pubescent ..... 8. *W. brevipes.*
Flowers purple ..... 9. *W. purpurea.*

GLYCOSMA. Fruit glabrous; carpel without caudate attenuation, mostly obtuse at base.

Fruiting rays usually erect, forming a compact cluster of fruits.. 10. *W. occidentalis.*
Fruiting rays spreading, forming a loose umbel.
Foliage puberulent; seed face deeply sulcate..... 11. *W. bolanderi.*
Foliage glabrous; seed face slightly concave..... 12. *W. ambigua.*

1. **Washingtonia claytoni** (Michx.) Britton, Ill. Fl. **2**: 530. 1897.

Myrrhis claytoni Michx. Fl. Bor. Am. **1**: 170. 1803.
Osmorhiza brevistylis DC. Prodr. **4**: 232. 1830.

Rather stout, villous-pubescent; leaves 2 to 3-ternate; leaflets 5 to 7.5 cm. long, acuminate, much cleft and toothed; umbel 4 to 6-rayed, with involucre and involucels of few bracts; rays stout, somewhat spreading, 2.5 to 5 cm. long; pedicels 6 to 20 mm. long; fruit (not including the attenuation) 12 mm. long, 2 mm. wide, bristly on the ribs; stylopodium and style 1 mm. long, the former slender conical; seed face less deeply concave than in *W. longistylis.*

Type locality, "in montibus Alleghanis."

In woods, Nova Scotia to the mountains of North Carolina, and westward to Minnesota, Nebraska, Missouri, and Alabama.

Specimens examined:

MAINE: Aroostook County, *Fernald* 51, July 10, 1893; Leeds, *Jennie M. Haskell*, August, 1893.

VERMONT: Peacham, *Alice F. Stevens*, June–September, 1892; Manchester, *M. A. Day* 84, July 1, 1898.

MASSACHUSETTS: Near Boston, *Biltmore Herb.* 1362*c*.

NEW YORK: Near Ithaca, *Cornell Univ. Coll.*, May, 1875; near Van Cortlandt, *Pollard*, June, 1893; Greene County, *Nash*, July 2, 1893.

PENNSYLVANIA: Lancaster County, *Small & Heller*, May 22, 1891.

NEW JERSEY: Bergen County, *Nash*, July 11, 1891; near Guttenberg, *Van Sickle*, May, 1893 and 1895; Tenafly, *Pollard*, May 26, 1894.

DISTRICT OF COLUMBIA: Near Washington, *Vasey*, in 1877; High Island, *Pollard* 252, May 19, 1895.

NORTH CAROLINA: In the mountains, *Vasey*, in 1878; Paint Rock, *Biltmore Herb.* 1362, May 7, 1896; Hot Springs, *Biltmore Herb.* 1362*b*, April 27, 1897.

ALABAMA: Monte Sano, *Baker*, May 23, 1897.

WEST VIRGINIA: Upshur County, *Pollock*, May 19, 1897.

OHIO: Lancaster, *Bigelow;* Niles, *Ingraham*, May, 1891; Lorain County, *Ricksecker*, in 1894.

MICHIGAN: Alma, *Davis*, August 28, 1891.

ILLINOIS: Near Peoria, *Brendel*, in 1873; near Naperville, *Umbach*, June 2, 1898.

MISSOURI: Jackson County, *Bush* 561, 867, May–June, 1896.

IOWA: Fayette County, *Fink* 76, May 29, 1894.

MINNESOTA: Near Fort Snelling, *Mearns* 401, in 1890 and 1891.

NEBRASKA: Near Ponca, *Clements* 2564, June 15, 1893.

2. **Washingtonia longistylis** (Torr.) Britton, Ill. Fl. **2**: 530. 1897.

Myrrhis longistylis Torr. Fl. U. S. 310. 1824.
Osmorhiza longistylis DC. Prodr. **4**: 232. 1830.

Stout, from sweet aromatic roots, glabrous or glabrate (sometimes quite pubescent when young); leaves, umbels, and fruit as in *W. claytoni*; stylopodium slender conical, 1 mm. long, bearing a style 2 mm. or more long; seed face deeply and broadly concave.

Type locality, "in wet meadows near Albany, New York, etc.;" the only original specimen now in Herb. Torrey is labeled "Montreal;" type in Herb. Columbia Univ.

In woods, Nova Scotia to the mountains of North Carolina and Alabama, and westward to the Black Hills, eastern Montana, and foothills of Colorado.

Specimens examined:

ONTARIO: Kingston, *Fowler*, July 8, 1895.
MASSACHUSETTS: Near Boston, *Biltmore Herb.* 674*c*.
CONNECTICUT: Near Greens Farms, *Pollard* 37, June 7, 1894.
PENNSYLVANIA: Union County, *Noll*; near Lancaster, *Small*, April–June, 1889.
DISTRICT OF COLUMBIA: Near Washington, *Vasey*, in 1875; banks of Canal, *Pollard* 177, May 8, 1895; shores of Potomac, *Braendle* 10, May 12, 1898.
NORTH CAROLINA: Near Biltmore, *Biltmore Herb.* 674, in 1897.
GEORGIA: Northern Georgia, *Vasey*, in 1878.
ALABAMA: Near Tuscaloosa, *Ward*, April 11, 1892.
WEST VIRGINIA: Upshur County, *Pollock*, May 22, 1897.
TENNESSEE: Knoxville, *Ruth* 429, May, 1898.
OHIO: Lancaster, *Bigelow*; Niles, *Ingraham*, May, 1891; Lorain County, *Ricksecker*, May 19, 1894.
ILLINOIS: Near Naperville, *Umbach*, June 2, 1898.
IOWA: Fayette County, *Fink* 77, May 15, 1894.
MINNESOTA: Center City, *Taylor*, June, 1892.
SOUTH DAKOTA: Black Hills, *Rydberg* 725, in 1892; Union County, *Wallace*, September, 1892.
MONTANA: Lower Falls of Missouri, *Williams* 275, June 15, 1886.
COLORADO: Foothills, Laramie County, *Osterhout*, August 7, 1896.

3. **Washingtonia brachypoda** (Torr.) Heller, Cat. N. Am. Pl. 5. 1898. FIG. 7.

Osmorhiza brachypoda Torr. Jour. Philad. Acad. II. **3**: 89. 1855.

Stout, from sweet aromatic roots, pubescent or sometimes glabrous; leaves ternately compound (often appearing pinnate after the first division); leaflets 2 to 3 cm. long, acute, laciniately lobed or toothed; umbel 1 to 6-rayed, with involucre and involucels of linear bracts, the latter equaling or exceeding the flowers; rays 3.5 to 10 cm. long; pedicels 1 to 2 mm. long; fruit 12 to 16 mm. long, 4 mm. wide, short attenuate at base, rough-bristly on the very prominent ribs; stylopodium and style 1 mm. long, the former broad and somewhat depressed; seed face very deeply concave, nearly inclosing a central cavity.

Type locality, "near the banks of Deer Creek," in the vicinity of

Nevada City, Nevada County, Cal.; collected by *Henry Pratten* in 1851.

California, from Sierra County southward.

Specimens examined:

CALIFORNIA: San Bernardino Mountains, *Cuby* 228, May, 1880; San Diego County, *Orcutt*, May, 1889; Kern County, *Greene*, June 24, 1889; Kern County, *Coville & Funston* 1171, July 6, 1891; near San Isabel, *Hensha* April 29, 1893; San Bernardino Mountains, *Parish* 3479, 4165, in 1894 and 1896; same station, *Leiberg* 3321, April 22, 1898.

4. **Washingtonia nuda** (Torr.) Heller, Cat. N. Am. Pl. 5. 1898.

Osmorhiza nuda Torr. Pacif. R. Rep. **4**: 93. 1856.
Crospermum nudum Kuntze, Rev. Gen. Pl. **1**: 270. 1891.
Myrrhis nuda Greene, Man. Bot. Bay Reg. 157. 1894.

Rather slender, about 6 dm. high, lower part of stem and foliage strigose pubescent, upper part of stem glabrous; basal leaves on long petioles; leaflets broadly ovate, 2 to 5 cm. long, obtuse or acutish, often deeply 3-lobed, coarsely dentate-serrate; umbels on elongated peduncles, with 3 or 4 spreading rays 7.5 to 10 cm. long, and 2 to 6 pedicels much longer than the fruit, sometimes 3 cm. long; fruit (immature) very hispid, especially at base, apparently obtuse; stylopodium 0.5 mm. long, as broad as high, longer than the style.

Type locality, "shady woods, Napa Valley," Cal.; collected by *Bigelow*, April 27, 1853 or 1854; type in Herb. Columbia Univ.

Central California, in the coast region.

Specimens examined:

CALIFORNIA: Santa Lucia Mountains, Monterey County, *R. A. Plaskett*, March, 1898.

5. **Washingtonia obtusa** C. & R., sp. nov.

Resembles *W. nuda*, but more slender and lower, almost glabrous; leaflets ovate to lanceolate, acute or acuminate, more sharply toothed; umbel with very widespreading rays (lateral ones even deflexed); the 2 to 4 pedicels 12 to 25 mm. long, longer than the fruit, which is about 16 mm. long, obtuse (often slightly pointed just at the tip), and less pubescent; stylopodium 0.5 mm. long or less.

Type locality, Ishawood Creek, northwestern Wyoming; collected by *Rose*, no. 476, August 8, 1893; type in U. S. Nat. Herb.

A species of the Rocky Mountain region and extending into the northeastern border of California.

Specimens examined:

BRITISH COLUMBIA: Kicking Horse Lake, Rocky Mountains, *Macoun*, July 23, 1885.
WYOMING: Yellowstone Park, *Tweedy*, July, 1885; *Rose* 476, as cited under type locality; Centennial Valley, *Nelson* 1722, in 1895.
COLORADO: Estes Park, *Ball*, July, 1884; continental divide west of North Park, altitude 2,210 meters, *Crandall* 187, July 20, 1894; Telluride, altitude 3,000 meters, *Tweedy* 206, August 25, 1894; Empire, *Bethel*, July, 1895; near Cameron Pass, 2,850 meters, *Baker* 8, July 17, 1896; West Mancos Cañon, altitude 2,700 to 3,000 meters, *Baker, Earle & Tracy* 188, June 28, 1898; La Plata

Cañon, *Baker, Earle & Tracy* 849, July 11, 1898; west of Mount Hesperus, *Baker* 188, 250, April–June, 1898.

NEW MEXICO: Santa Fé Canyon, altitude 2,400 meters, *A. A. & E. Gertrude Heller* 3822, July 7, 1897.

ARIZONA: San Francisco Mountains, *Toumey* 39, July 15, 1892; about Mormon Lake, altitude 1,800 meters, *MacDougal* 101, July 12, 1898; Humphreys Peak, San Francisco Mountains, altitude 2,700 to 3,600 meters, *MacDougal* 397, August 7–10, 1898.

UTAH: Wahsatch Mountains, altitude 2,100 meters, *Watson* 446, July, 1869; mountains east of Gunnison, altitude 2,580 meters, *Ward* 203, June 28, 1875; near Provo, altitude 2,400 meters, *Jones* 5580, July 3, 1894.

CALIFORNIA: Sierra County, *Lemmon*, in 1883 and 1889.

6. **Washingtonia divaricata** Britton, Ill. Fl. **2**: 531. 1897.

W. intermedia Rydberg, Mem. N. Y. Bot. Garden **1**:289. 1900.

Resembles *W. nuda*, but 3 to 7 dm. high, and nearly glabrous; leaflets thin and larger, becoming 6 cm. long, lanceolate to ovate, acute to acuminate, coarsely toothed and usually incised; umbels with 2 to 9 spreading rays, and pedicels 10 to 18 mm. long, usually about as long as the fruit, sometimes longer or shorter; fruit 16 to 20 mm. long, with a distinct beak 2 mm. long; stylopodium and style 1 mm. long, the former not so broad as high and longer than the very short style.

Type locality, "Oregon;" collected by *Nuttall;* type in Herb. Columbia Univ.

From Oregon and northern California to South Dakota, and northward to Alaska.

Specimens examined:

ALASKA: Sitka, *Kellogg* 172, in 1867; Point Gustavus, Glacier Bay, *Coville & Kearney* 726, June 10–12, 1899; Douglas and Baranoff Islands, *Trelease* 4527, 4528, June–July, 1899.

WASHINGTON: Puget Sound, *Wilkes Exped.* 365; Yakima Region, *Tweedy*, August, 1882; *G. R. Vasey* 306, in 1889; Rock Creek, Spokane County, *Suksdorf* 1195, June 5, 1889; Olympia and Yakima counties, *Henderson* 376, in 1892; upper valley of the Nesqually, Cascade Mountains, *Allen* 34, August 28, 1893.

OREGON: Crater Pass, Cascade Mountains, *Newberry;* near Fort Klamath, altitude 1,470 meters, *Leiberg* 681, August 8, 1894; Cougar Peak, altitude 1,920 meters, *Coville & Leiberg* 197, August 3, 1896.

CALIFORNIA: Sierra County, *Lemmon* 26, August, 1883; Mendocino County, *Brown* 852, June, 1898.

IDAHO: Nez Perces County, *Sandberg* 168, May 14, 1892; Moscow Mountains, *Henderson*, in 1894; head of Pettit Lake, *Henderson* 3614, July 29, 1895; near Sohan's Pass, altitude 1,650 meters, *Leiberg* 427, August 1, 1895; Nez Perces County, altitude 450 to 600 meters, *A. A. & E. Gertrude Heller* 3137, 3385, May–July, 1896; Rush Creek, Salubria, Washington County, *Jones*, July 10, 1899.

UTAH: City Creek Canyon, altitude 1,890 meters, *Jones* 1852, July 13, 1880.

MONTANA: Helena, *Kelsey*, in 1887; near Red Lodge, *Rose* 30, July 26, 1893; Columbia Falls, *Williams* 615, June, 1893 and 1894; Spanish Basin, Madison Range, altitude 1,800 meters, *Flodman* 687, July 11, 1896; Bridger Mountains, altitude 2,100 meters, *Rydberg & Bessey* 4595, June 17, 1897 (type of *W. intermedia* Rydberg).

WYOMING: Teton Mountains, *A. & E. Nelson* 6473, August 16, 1899.

SOUTH DAKOTA: Lead City, Black Hills, altitude 1,650 to 1,950 meters, *Rydberg* 724, July 6, 1892.

The specimen from Mendocino County, Cal. (*Brown* 852), is more pubescent than usual, and seems to be somewhat out of the range, but we can make no other reference of it at present.

7. **Washingtonia leibergi** C. & R., sp. nov.

Resembles *W. nuda*, but almost glabrous; leaflets thin, ovate to lanceolate, acuminate or acute, more sharply toothed; umbels not widely spreading; pedicels about 10 to 15 mm. long, longer than the immature fruit; fruit but slightly hispid at base and nearly glabrous above, distinctly constricted below the truncate tip; stylopodium very low and flat, or sometimes even obsolete.

Type locality, Nason Creek, branch of Wenatchee River, Kittitas County, Washington; collected by *Sandberg & Leiberg*, no. 666, August 4, 1893; type in U. S. Nat. Herb.

Mountains of Washington and Idaho.

Specimens examined:

WASHINGTON: Mount Paddo (Adams), altitude 1,500 to 1,800 meters, *Suksdorf* 1194, July 12, 1886; Olympic Mountains, *Piper* 911, September 30, 1890; *Sandberg & Leiberg* 666, as cited under type locality.

IDAHO: Packsaddle Peak, Kootenai County, *Sandberg* 845, August 6, 1892.

8. **Washingtonia brevipes** C. & R., sp. nov.

Resembles *W. nuda* in habit and strigose pubescence, but umbels with 3 to 7 rays, and pedicels 4 to 12 mm. long, shorter than the fruit, which is 14 to 16 mm. long, with a distinct beak 2 mm. long, and bearing a stylopodium sometimes even shorter than that of *W. nuda*.

Type locality, Mount Shasta and vicinity, Siskiyou County, Cal.; collected by *Palmer*, no. 2481, July 13–27, 1892; type in U. S. Nat. Herb.

From northern Washington to southern California, and adjacent Idaho.

Specimens examined:

CALIFORNIA: Ukiah, Mendocino County, *Bolander* 4649, in 1866; Sonoma County, *E. Samuels* 96; Plumas County, *Mrs. R. M. Austin;* Emigrant Gap, Placer County, *Jones* 2734, June 29, 1882; Sierra County, *Lemmon*, in 1883; Plumas County, *Lemmon*, June 4, 1889; Kaweah River Valley, Tulare County, *Corille & Funston* 1362, in 1891; Amador County, *Hansen* 331, April 19, 1892; Bolinas Ridge, Marin County, *Palmer* 2301, June 14–16, 1892; Mount Shasta and vicinity, Siskiyou County, *Palmer* 2481, July 13–27, 1892; Cuyamaca Mountains, San Diego County, altitude 1,380 meters, *Parish* 4421, June 5–7, 1897.

OREGON: Near Portland, *Kellogg & Hayford* 311, May 24, 1869.

WASHINGTON: Near Seattle, *Smith* 110, April 23, 1889; same station, *Piper* 110, July, 1891; Falcon Valley, *Suksdorf* 2115, May–June, 1892; *Sheldon* 8058, in 1897; Blue Mountains, *Horner* 215, August 9, 1897; Chehalis County, *A. & E. Gertrude Heller* 3975, June 28, 1898; Mount Stuart, Cascades, Kittitas County, *Elmer* 1176, August, 1898.

IDAHO: Payette Lake, Canyon County, *Jones*, July 10, 1899.

9. **Washingtonia purpurea** C. & R., sp. nov.

Slender or sometimes rather stout, from a thick elongated root, 1 to 6 dm. high, nearly glabrous; basal leaves clustered and often short-petioled, once to twice ternate as are the stem leaves; leaflets ovate to lanceolate, acute to acuminate, irregularly and sharply-lobed and toothed, 2 to 7 cm. long; fruiting umbels widely spreading, of 2 to 4 rays 5 to 7.5 cm. long; pedicels 2 to 4, longer than the fruit, 12 to 20 mm. long; flowers bright purple; fruit slightly hispid at base and glabrous above, 10 to 12 mm. long, slightly beaked at apex; stylopodium prominent and flat (the two stylopodia forming a conspicuous disk), the short style arising from its inner edge.

Type locality, Sitka, Alaska; collected by *Coville & Kearney* on the Harriman expedition, No. 796, June 14–17, 1899; type in U. S. Nat. Herb.

Mountains of northern Oregon to Alaska.

Specimens examined:

OREGON: Mount Hood, *Henderson*, September, 1884.

WASHINGTON: Chehalis County, on peak at altitude of 900 to 1,050 meters, *Lamb* 1382, August 4, 1897.

BRITISH COLUMBIA: Mountains near Kootenai Lake, *Macoun*, July 9, 1890.

ALASKA: Juneau, *Grace E. Cooley*, July 24, 1891; Mount Verstovia, Sitka, *Erermann* 223, August 14, 1892; Yes Bay, *Gorman* 23, June 6, 1895; Juneau, Sitka, and Port Wells (Prince William Sound), *Coville & Kearney* 590, 796, 1264, June 6–26, 1899; Baranoff Island, *Trelease* 4525, June 14, 1899; Yakutat Bay, *Saunders* 4526, June 20, 1899.

10. **Washingtonia occidentalis** (Nutt.) C. & R.

Glycosma occidentalis Nutt. in Torr. & Gray Fl. **1**: 639. 1840.
Osmorhiza occidentalis Torr. Bot. Mex. Bound. 71. 1859.
Myrrhis occidentalis Benth. & Hook. Gen. Pl. **1**: 897. 1867.

Rather stout, puberulent (stems sometimes glabrous or pubescent at the nodes); leaves 2 or 3-ternate; leaflets lanceolate-oblong, 3.5 to 10 cm. long, acute, coarsely serrate, rarely incised; umbel 5 to 12-rayed, naked or with 1 or 2 involucral bracts; fruiting rays 2.5 to 12.5 cm. long, usually erect and forming a somewhat compact cluster of fruits; pedicels 2 to 8 mm. long; fruit 12 to 16 mm. long, obtuse at base, glabrous, distinctly beaked, and with prominent acute ribs; stylopodium and style 1 to 2 mm. long, the former mostly conical; seed face strongly concave.

Type locality, "western side of the Blue Mountains of Oregon;" collected by *Nuttall;* type in Herb. Columbia Univ.

From Alberta to northern California and the mountains of Colorado.

Specimens examined:

ALBERTA: Watertown Lake, *Macoun* 10678, July 28–31, 1895.

WASHINGTON: *Wilkes Exped.* 508; *Dr. Cooper;* Simcoe Mountains, *Suksdorf* 1198, June 6, 1884; *G. R. Vasey* 304, in 1889; Eastern Cascade Mountains, *Henderson* 377, June 11, 1892; *Sandberg & Leiberg* 502, in 1893; Blue Mountains, Wallawalla County, *Piper* 2334, July 16, 1896; Wenatchee, *Whited*, June

28, 1896; Blue Mountains, *Horner* 217, May 18, 1897; head of Poison Creek, altitude 1,530 meters, *Gorman* 669, September 1, 1897.

OREGON: Morrow County, altitude 790 meters, *Leiberg* 99, May 22, 1894; Steins Mountains, altitude 1,820 meters, *Leiberg* 2490, July 5, 1896; Blue Mountains, *Cusick* 1816, 1817, 1819, August, 1897.

IDAHO: Kootenai County, *Sandberg*, July, 1881; Nez Perces County, *Sandberg* 108, May 3, 1892; Moscow Mountains, *Henderson* 2661, 2662, July–August, 1894; Pettit Lake, altitude 2,160 to 2,250 meters, *Evermann* 337, August 14, 1895; Soldier Mountain, altitude 3,000 meters, *Henderson* 3182, July 15, 1895; near Salmon, altitude 2,460 meters, *Henderson* 4069, August 27, 1895; Stevens Peak, altitude 534 meters, *Leiberg* 444, August 3, 1895; Nez Perces County, altitude 1,050 meters, *A. A. & E. Gertrude Heller* 3451, July 16, 1896; near Sawtooth, *Evermann* 562, 658, July 9–28, 1896; Henrys Lake, *Rydberg* 4598, July 31, 1897; Seven Devils Mountains, *Jones*, August 5, 1899.

MONTANA: Near Helena, *Kelsey*, June 21, 1889; *Williams* 196, July 25, 1894; Bridger Mountains, altitude 2,100 meters, *Flodman* 690, July 28, 1896; Spanish Basin, Madison Range, altitude 1,800 meters, *Flodman* 688, July 11, 1896; Bridger Mountains, *Rydberg* 4597, June 12, 1897.

WYOMING: Carbon County, *Nelson* 4191, August 16, 1897; Teton Mountains, *A. & E. Nelson* 6472, August 16, 1900.

COLORADO: Steamboat Springs, *Alice Eastwood*, in 1891; same station, *Crandall*, July 25, 1891; Delta County, altitude 2,100 meters, *Coulter* 17, August 2, 1893; Williams Park, altitude 2,400 meters, *Bethel* 3614, August 15, 1895; Steamboat Springs, altitude 2,100 meters, *Baker* 3, July 22, 1896; La Plata Mountains, altitude 3,000 meters, *Baker, Earle & Tracy* 177, June 26, 1898; Mount Hesperus, altitude 3,000 meters, *Baker* 177, June 26, 1898.

UTAH: Near Ogden, *Letterman*, July 29, 1885; Provo, *Tracy* 684, August 16, 1887; same station, altitude 2,400 meters, *Jones* 5581, July 3, 1894.

NEVADA: Humboldt Mountains, *Torrey*, in 1865; same station, *Watson* 447, August, 1868.

CALIFORNIA: Nevada County, *Jones* 2511, July 25, 1881; Plumas County, *Lemmon* 44, July 28, 1889, Lassens Peak, *Mrs. Austin*, August, 1896.

The specimen from Provo, Utah, collected by *Tracy* (no. 684), August 16, 1887, seems to be this species, but the fruits are 20 mm. long.

11. **Washingtonia bolanderi** (Gray) C. & R.

Myrrhis bolanderi Gray, Proc. Am. Acad. **7**: 346. 1868.
Glycosma bolanderi Gray, Proc. Am. Acad. **8**: 386. 1872.
Osmorhiza occidentalis bolanderi C. & R. Rev. N. Am. Umbell. 119. 1888.

Stout, 9 to 10 dm. high, somewhat pubescent at the nodes, and the foliage puberulent; leaflets broadly ovate, coarsely serrate or toothed, 5 cm. long or less; fruiting rays somewhat spreading, 3 to 6 cm. long; pedicels 2 to 4 mm. long, shorter than the sterile flowers; fruit 20 mm. long, with a stout beak; stylopodium flat, much shorter than the style; seed face deeply sulcate.

Type locality, "Lamberts Lake, Mendocino County," Cal., collected by *Bolander* in 1867; type in Herb. Gray.

Mendocino County, Cal.

Specimens examined:

CALIFORNIA: Type specimen as cited under type locality; Cahto, Mendocino County, *Kellogg & Harford* 312, May 24, 1869.

The Cahto specimens cited above, and in the Botany of California referred by Watson to *W. ambigua*, are clearly to be associated with *W. bolanderi*. They are less puberulent than the type specimens of that species, and the fruit is considerably smaller (14 to 16 mm. long).

12. **Washingtonia ambigua** (Gray) C. & R.

Glycosma ambiguum Gray, Proc. Am. Acad. **8**: 386. 1872.
Osmorhiza ambigua C. & R. Rev. N. Am. Umbell. 119. 1888.

Glabrous, or hairy near the nodes; leaves 2 to 3-ternate; leaflets broadly ovate, thin, 2.5 to 6.5 cm. long, acute, serrate, and more incised than in *W. occidentalis;* umbel 4 to 8-rayed, naked; fruiting rays 3 to 6 cm. long, widely spreading; pedicels 2 to 10 mm. long; fruit 12 to 18 mm. long, acutish at base, glabrous, and distinctly beaked; stylopodium slightly conical, style 1 mm. long; seed face slightly concave.

Type locality, "foot of Cascade Mountains, Oregon;" collected by *Hall*, no. 217, in 1871; type in Herb. Gray.

Mountains of Oregon and Washington.

Specimens examined:

OREGON: Type specimen as cited under type locality; Oakland, *Howell* 178, April, 1881; Wolf Creek, Josephine County, *Howell* 124, May 23, 1884.

WASHINGTON: Falcon Valley, *Suksdorf* 382, July, 1880; Mount Paddo (Adams), *Suksdorf* 1197, August 10, 1882; same station, *Henderson*, in 1882; same station, *Suksdorf* 1196, September 18, 1884; same station, altitude 1,800 to 2,100 meters, *Suksdorf*, June-August, 1885; Goat Mountains, altitude 1,350 meters, *Allen* 256, August 8–September 19, 1896.

In examining the type specimen we find that the character "ribs toward the base more or less setose" is based upon a single detached fruit, which proves to belong to *W. purpurea*. All the other fruits on the type sheet are completely glabrous.

Specimens collected by *Howell* at Grant's Pass, Josephine County, Oreg. (no. 123, May 25 and June 21, 1884), and at Oakland, Oreg. (no. 178, April, 1881), seem to belong to *W. ambigua*, but they are quite pubescent.

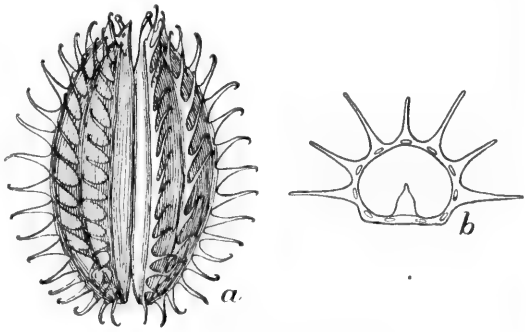


FIG. 8.—Caucalis microcarpa: *a*, *b*, ×8.

8. **CAUCALIS** L. Sp. Pl. **1**: 240. 1753.

Calyx teeth prominent. Fruit ovate or oblong, flattened laterally. Carpel with 5 filiform bristly primary ribs (each with a prominent group of strengthening cells) and 4 prominent winged secondary ones (without strengthening cells) with barbed or hooked prickles. Stylopodium thick conical. Oil tubes solitary in the inter-

vals (under the secondary ribs), 2 on the commissural side. Seed face deeply sulcate.

Mostly hispid annuals (ours), with pinnately dissected leaves (with very small segments) and white flowers. The primary lateral ribs are pushed around upon the commissural face, making a very narrow commissure, while the adjoining secondary ribs become marginal. Closely resembles *Daucus*.

The first species cited by Linnæus is *C. grandiflora*, which has proved to be a *Daucus;* the second species cited is *C. daucoides*, a true *Caucalis*.

A group of 5 species, as restricted by Drude, but one of which is native in the Western Hemisphere.

1. **Caucalis microcarpa** Hook. & Arn. Bot. Beechey, 348. 1840.

FIG. 8.

Erect, slender, 7.5 to 37.5 cm. high, more or less hispid and sometimes glabrate; leaves much dissected; umbels at the ends of stem and branches, very unequally 3 to 6-rayed, with involucre of foliaceous divided bracts, and involucels of entire or somewhat divided bractlets; rays slender, 7.5 cm. or less long; pedicels very unequal; fruit oblong, 4 to 6 mm. long, armed with rows of hooked prickles; the primary lateral ribs near margin of commissural face.

Type locality, California; collected by *Douglas*.

From Washington and Idaho to southern California and Arizona, and extending into Mexico.

Specimens examined:

WASHINGTON: Klickitat County, *Suksdorf* 16, June 1, 1881; near Pullman, Whitman County, *Henderson* 1346, June, 1892; Wawawai, Whitman County, *Piper*, May 19, 1894; same station, *Elmer* 93, May, 1897.

IDAHO: Nez Perces County, *Sandberg* 328, June 16, 1892; same station, *A. A. & E. Gertrude Heller* 3097, May 20, 1896.

OREGON: John Day Valley, *Howell*, May, 1885.

CALIFORNIA: *Bigelow*, in 1853–54; *Bolander* 4699, in 1866; *Kellogg & Harford* 1160, in 1868–69; near Los Angeles, *Hasse*, April, 1888 and 1891; Oakland Hills, *Lemmon* 62, in 1889; near San Diego, *Orcutt;* Little Chico Canyon, *Mrs. Bruce* 69, May, 1896; Santa Catalina Island, *Blanche Trask*, March, 1897; North Fork of San Gabriel River, altitude 550 meters, *Leiberg* 3398, May 10, 1898.

NEVADA: Mica Spring, altitude 1,200 meters, *Jones* 5045, April 13–14, 1894.

UTAH: Silver Reef, altitude 1,050 meters, *Jones* 5163, May 4, 1894.

ARIZONA: Thumb Butte, Prescott, *Rusby*, May 28, 1883; Sierra Tucson, *Pringle*, April 15, 1884; near Tucson, *Toumey* 194, April 12, 1892; Pierce's Spring, altitude 450 meters, *Jones* 5077, April 18, 1894.

For introduced species see page 252.

9. **BIFORA** Hoffm. Umb. Gen. ed. 2. 191. 1816.

Calyx teeth evident. Fruit broader than long, flattened laterally, the globose carpels in contact only by a narrow commissure. Carpel

with 4 filiform secondary ribs and thin very hard pericarp. Stylopodium conical, with styles recurved over the carpels. Oil tubes none. Seed face deeply concave.

Slender smooth annuals, with leaves pinnately dissected into filiform segments, involucre and involucels of few small bracts, and white flowers in few-rayed umbels.

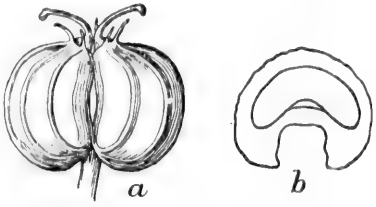


FIG. 9.—Bifora americana: *a*, *b*, × 6.

Type species, *B. dicocca* Hoffm. l. c., of Europe and the Orient.

A group of 5 species, 4 of which are distributed throughout Europe and Asia, and a single one in North America, almost entirely restricted to the dry plains of Texas.

1. **Bifora americana** (DC.) Watson, Bibl. Index 415. 1878. FIG. 9.

Atrema americana DC. Coll. Mém. **5**: 71. pl. 18. 1829.
Anidrum americanum Kuntze, Rev. Gen. Pl. **1**: 264. 1891.

Stems 3 dm. or more high, branching above; umbels 5 to 8-rayed; rays 12 to 18 mm. long; pedicels about 2 mm. long; fruit 3 mm. long, 5 mm. broad.

Type locality, "près de la rivière Rouge;" collected by *Nuttall;* type in Herb. DC., duplicate in Herb. Philad. Acad.

Dry ground, throughout Texas, and extending into the borders of Indian Territory and probably Arkansas.

Specimens examined:

TEXAS: *Lindheimer* 405, in 1846–1848; Nueces region, *Wright* 1108, in 1851; Burton, *Hall* 262, May 25, 1872; near Dallas, *Reverchon* 374, May, 1879; Gillespie County, *Jermy* 139; near San Sabin, *Nealley* 156, July, 1890; Brazos County, *Dewey*, June 9, 1891; Kerr County, *Heller* 1656, May 14–21, 1894; Industry, *Wurzlow*, May, 1895.

INDIAN TERRITORY: Near Caddo, *Sheldon* 41, June 20, 1891.

For introduced species see page 252.

10. APIASTRUM Nutt. in Torr. & Gray, Fl. 1: 643. 1840.

Calyx teeth obsolete. Fruit ovate or cordate, with obscure or obsolete ribs, more or less tuberculate. Carpel with thin pericarp and no strengthening cells. Stylopodium minute and depressed, with short style. Oil tubes solitary in the intervals and beneath the ribs, 2 on the commissural side. Seed face narrowly concave or sulcate.

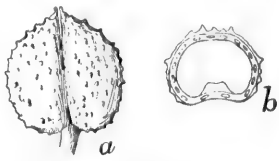


FIG. 10.—Apiastrum patens: *a*, × 10; *b*, × 12.

Very slender smooth branching (somewhat dichotomously annuals), with finely dissected leaves having fili-

form or linear (sometimes a little broader) segments, and small white flowers in naked unequally few-rayed umbels.

First species cited, *A. angustifolium* Nutt.

A North American genus containing two species, one Californian, the other in the Missouri-Texas region.

Umbels sessile; fruit cordate at base; Californian..... 1. *A. angustifolium.*
Umbels peduncled; fruit rounded at base; Missouri-Texas..... 2. *A. patens.*

1. **Apiastrum angustifolium** Nutt. in Torr. & Gray, Fl. **1**: 644. 1840.

A. latifolium Nutt. l. c.

(?) *Heloscíadium leptophyllum* (?) *latifolium* Hook. & Arn. Bot. Beechey 347. 1840.

Slender, 0.5 to 3 dm. high, sometimes simple, usually much branched; leaves 2.5 to 5 cm. long, biternately or triternately divided, with linear or nearly filiform segments (rarely linear-oblong); umbels sessile; rays from 2.5 cm. long to wanting; pedicels 1.2 cm. long to wanting; fruit with narrow commissure, cordate in outline, 1 mm. long.

Type locality, "San Diego, California;" collected by *Nuttall;* type in Herb. Gray.

California, from Mendocino County southward, and extending into Lower California.

Specimens examined:

CALIFORNIA: San Luis Rey, *Mex. Bound. Surv.*, in 1850; near Clear Lake, *Torrey* 160, in 1865; *Kellogg & Harford* 305, in 1868–69; Santa Clara County, *Mrs. Ames*, in 1877; San Diego, *Jones* 3089, March 20, 1882; same station, *Pringle*, May 4, 1882; same station, *Orcutt*, in 1886 and 1889; Oakland Hills, *Chesnut*, May 9, 1888; same station, *Lemmon* 50, in 1889; Los Angeles, *Hasse*, April, 1891; Vaca Mountains, *Jepson*, June 20, 1892; San Isabel, *Henshaw*, April 18, 1893; near San Bernardino, *Parish*, May, 1893; Amador County, altitude 120 meters, *Hansen* 1042, April 18, 1895; San Nicholas Island, *Blanche Trask*, April, 1897; Avalon, Santa Catalina Island, *Blanche Trask*, May, 1897; Monterey County, *Plaskett* 102, April, 1898.

We have not seen the Hooker and Arnott plant referred to under the synonymy. It has priority of publication, but the description is not definite enough to make us certain of this reference.

2. **Apiastrum patens** (Nutt.) C. & R. Rev. N. Am. Umbell. 110. 1888. FIG. 10.

Leptocaulis patens Nutt. in DC. Prodr. **4**: 107. 1830.
Apium patens Watson, Bibl. Index, 413. 1878.

Slender, 3 to 6 dm. high, branching above; leaves 2.5 to 5 cm. long, ternately or biternately divided, with long filiform segments; umbels long-peduncled; rays and pedicels as in *A. angustifolium;* fruit with broader commissure, ovate, slightly larger, rounded at base.

Type locality, "Red River," Arkansas; collected by *Nuttall.*

From the southern border of Lake Michigan to Texas.

Specimens examined:

INDIANA: Along railway track, Miller, Lake County, *Umbach*, June 24, 1898.

Missouri: Jackson County, *Bush* 296, June 3, 1896; Eagle Rock, *Bush* 9, June 18, 1897; Clay County, *Mackenzie*, June 20, 1897; Atherton, *Bush* 121, June 27, 1898.

Arkansas: Decatur, *Plank*.

Indian Territory: Sapulpa and Sequoyah, *Bush* 186, 187, June, 1894.

Oklahoma: Huntsville, Kingfisher County, *Laura Blankinship*, May–June, 1896.

Texas: On the San Pedro and the Pecos, *Wright* 1106, in 1851; near Austin, *Hall* 250, May 10, 1872.

Leptocaulis inermis Nutt. in DC. Coll. Mem. **5**: 39, 1829, is certainly congeneric with this species and has even been considered by some to be only a smooth fruited form of it. An examination of Nuttall's specimens at the Philadelphia Academy of Sciences would seem to indicate a different species. A smooth fruited form was also collected by Reverchon in Texas many years ago. Collectors in the Southwest should look for this plant.

11. **ERIGENIA** Nutt. Gen. **1**: 187. 1818.

Calyx teeth obsolete. Fruit strongly flattened laterally, nearly orbicular, notched at base and apex, glabrous, thin between the incurved carpels. Carpels strongly flattened laterally, with equal filiform ribs, very thin pericarp, and strengthening cells beneath the ribs. Oil tubes 1 to 3 in the intervals, 9 to 11 on the commissural side (from which extends a prominent corky neck-like projection, meeting its fellow from the other carpel and forming the thin area between the curved carpels). Seed face narrowly and deeply sulcate.

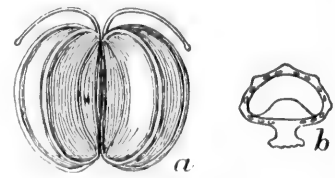


Fig. 11.—Erigenia bulbosa: *a*, ×8; *b*, ×10.

Low, glabrous, nearly acaulescent plant, from a deep-seated tuber, with ternately decompound leaves and oblong segments, no involucre (unless a reduced leaf), involucels of leafy linear or spatulate bractlets, and white flowers in small compact umbels.

A monotypic genus (based on *Sison bulbosum* Michx.) of the United States and Canada east of the Great Plains.

When Nuttall established this genus he stated that it was probably composed of two species, but only one was described or named. His idea of a second species was given in a drawing by C. W. Short. We have carefully examined much material of this genus with the idea that it might be segregated, but have not been able to see any dividing line. The early and late forms are quite different, but there seems to be no warrant for Nuttall's statement. Most of the material we have examined has been from the Northern States, but this has been carefully compared with specimens collected at Knoxville, Tenn. (the type locality of *E. bulbosa*).

1. **Erigenia bulbosa** (Michx.) Nutt. Gen. **1**: 188. 1818. Fig. 11.

Sison bulbosum Michx. Fl. Bor. Amer. **1**: 169. 1803.

Low, 2 dm. or less high; leaves basal except those subtending the imperfect umbels; pedicels very short; fruit 2 mm. long, 3 mm. broad.

Type locality, "prope Knoxville," Tenn.

Illust.: Engler & Prantl, Nat. Pflanzenfamilien **3**[8]: 165. 1898.

Range as given under the genus.

Specimens examined:

PENNSYLVANIA: York County, *Garber*, May 4, 1868.
MARYLAND: Plummer Island, *Rose* 1145, April 23, 1897.
DISTRICT OF COLUMBIA: Little Falls, *Vasey*, in 1873 and 1879; High Island, *Ward*, in 1879; Great Falls, *Vasey*, in 1881; High Island, *Pollard* 25, April 6, 1895.
TENNESSEE: Knoxville, *Ruth* 423, April, 1898; same station, *Kearney*.
KENTUCKY: Near Frankfort, *Williamson*, April, 1878.
OHIO: Lancaster, *Bigelow;* near Niles, *Ingraham*, May, 1891; Lorain County, *Rieksecker*, March, 1894; Collamer, *Stair*, April 20, 1895.
INDIANA: Near Mattsville, *Wilson* 9, April 22, 1892.
MICHIGAN: Bellevue, *Shoop;* near Alma, *Davis*, April 29, 1891.
ILLINOIS: Naperville, *Umbach*, April-May, 1898.
KANSAS: Baxter Springs, *Plank*.

12. **OROGENIA** Watson, Bot. King Surv. 120. 1871.

Calyx teeth minute. Fruit oblong, very slightly flattened laterally, glabrous. Carpel much flattened dorsally, with filiform dorsal and intermediate ribs; laterals excessively corky thickened, involute (that is, extended toward the other carpel, leaving between the commissural faces a cavity, which is divided longitudinally by a thick corky projection from the middle of each face); all with distinct groups of strengthening cells. Stylopodium depressed. Oil tubes very small, 3 in the intervals, 2 to 4 on the commissural side. Seed face slightly concave.

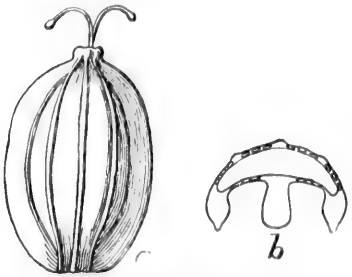


FIG. 12.—Orogenia linearifolia: *a*, *b*, × 8.

Dwarf glabrous nearly acaulescent plants, from tuberous or fusiform roots (underground part of the stem sheathed with large scarious bracts), with ternate leaves and linear segments, no involucre, involucels of few linear bractlets, and white flowers in subcompound umbels with very unequal rays.

Type species, *O. linearifolia* Watson.

A group of two species, restricted to the United States west of the Rocky Mountains.

Stems from deep-seated round tubers ..... 1. *O. linearifolia.*
Stems from long fusiform roots ..... 2. *O. fusiformis.*

1. **Orogenia linearifolia** Watson, Bot. King Surv. 120. pl. 14, figs. 1–3. 1871. FIG. 12.

Stem (or scape) slender, rising 2 to 12 cm. above ground from a deep-seated round tuber; leaves 2 or 3, once or twice ternate, upon slender petioles; leaflets entire, 2.5 to 5 cm. long, 2 to 6 mm. wide, obtuse; umbels 2 to 10-rayed, with nearly sessile flowers; fruit 3 to 4 mm. long, lateral ribs and commissural projection much more strongly developed than in *O. fusiformis*.

Type locality, "damp shaded ridge of the Wahsatch, north of Parleys Park, 7,500 feet altitude;" collected by *Watson*, no. 440, June 28, 1869; type in U. S. Nat. Herb.

From Washington and Idaho to Oregon, Utah, and southwestern Colorado.

Specimens examined:

WASHINGTON: "East of the Cascade Mountains to the Columbia," *Wilkes Exped.*; Falcon Valley, *Suksdorf*, May 17, 1882.

OREGON: Yamhill County, *Summers*, May, 1878; *Cusick*, in 1884.

IDAHO: *Wilcox*, in 1885.

UTAH: *Watson* 440, as cited under type locality; City Creek Canyon and Scipio, *Jones*, in 1880.

COLORADO: Mancos, *Alice Eastwood*, May 1, 1891.

2. **Orogenia fusiformis** Watson, Proc. Am. Acad. **22**: 474. 1887.

Resembling *O. linearifolia*, but stouter, 7.5 to 15 cm. above ground, from a long fusiform root; leaves more compounded, 2 to 3-ternate, with terminal leaflets often 3-parted; leaflets 2.5 cm. or less long; umbels 6 to 12-rayed; rays longer; fruit about 6 mm. long, 3 mm. broad; lateral ribs and commissural projection smaller.

Type locality, "in Plumas County, Cal.;" collected by *Mrs. R. M. Austin* in 1880; type in Herb. Gray. This is the first specimen cited in the original description, and associated with it is the following: "Among sagebrush near Truckee, Nevada County," *Sonne*, March–May, 1886.

Northeastern California (Plumas and Nevada counties) and southeastern Oregon.

Specimens examined:

CALIFORNIA: Near Prosser Creek, Nevada County, *Sonne*, May–June, 1895.

OREGON: *Leiberg* 4070, in 1899.

Orogenia fusiformis leibergi C. & R. Rev. N. Am. Umbell. 92. 1888.

A taller, more slender form, 3 dm. or more high, with petioles correspondingly elongated.

Type locality, "sandhills in the Bitterroot Mountains, Idaho;" collected by *Leiberg*, June, 1887; type in Herb. Coulter.

The type specimens are the only ones known.

This is not only a much taller plant than the species, but it blooms considerably later, and mature fruit may reveal characters which will compel a different reference.

13. **HESPEROGENIA** C. & R. Contr. Nat. Herb. **5**: 203. 1899.

Sepals obsolete. Fruit flattened laterally, nearly orbicular or short-oblong, rounded at base and apex, glabrous. Carpel nearly terete in section, with equal, indistinct, filiform ribs and thin pericarp. Stylopodium none. Oil tubes 2 or 3 in the intervals. Seed face broad, slightly concave.

Low acaulescent plants, with leaves once or twice ternate and with

broadish segments, umbel of few unequal rays without involucre and with one or two bractlets, and yellow flowers.

A monotypic genus, known as yet only from Mount Rainier, Washington.

This genus is nearest to *Museniopsis*, but differs especially in its broad seed face, which is never involute or deeply concave. In the seed face it approaches *Eulophus* and *Pimpinella*, but differs from both in not having a conical stylopodium, and from the former also in its yellow flowers.

1. **Hesperogenia stricklandi** C. & R. Contr. Nat. Herb. **5**: 203. pl. 27. 1899. PLATE I.

Root deep seated, somewhat tuberous thickened, crowned with a slender rootstock (?); leaves 3 or 4, all basal, without stipular bases, ternate or biternate; the segments lanceolate, acute, 12 mm. long, glabrous; petioles 3.8 to 5 cm. long; scape 7.5 to 10 cm. long, either naked or with a small bract-like leaf; rays 3 to 6, some of the sterile as well as the fertile ones short (4 mm. long), others 14 mm. long; fruit 2 mm. long, either sessile or on pedicels 4 mm. or less long; styles long, reflexed.

Type locality, "Mount Rainier, Washington;" collected by *O. D. Allen*, no. 278; type in U. S. Nat. Herb. First collected by Mr. Percy Stickland, at same station.

Mount Rainier, Washington.

Specimens examined:

WASHINGTON: Mount Rainier, altitude 2,000 meters, *Allen* 278, August 30, 1897, and September 6, 1898; grassy meadows on north side of same mountain, altitude 1,540 meters, *J. B. Flett*, August, 1897.

EXPLANATION OF PLATE I.—Fig. *1*, plant; *2*, fruit; *3*, cross section of carpel—figs. *1* and *2* enlarged.

14. MUSINEON Raf. Jour. Phys. **91**: 71. 1820.

Musenium Nutt. in Torr. & Gray Fl. **1**: 642. 1840 (for full synonymy of genus and species, see Bot. Gaz. **20**: 258. 1895).

Calyx teeth prominent (in ours). Fruit ovate or ovate oblong, flattened laterally. Carpel flattened dorsally, with equal filiform ribs and thin pericarp with no distinct strengthening cells. Carpophore entire (in ours) or two-parted (Mexican form). Stylopodium depressed. Oil tubes usually 3 in the intervals, very unequal in size (middle one largest), 2 to 4 on the commissural side. Seed face broadly concave.

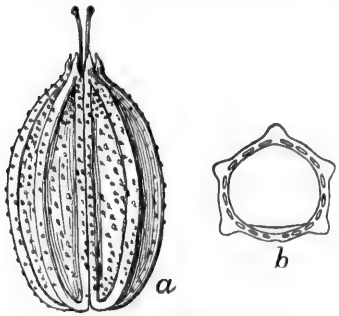
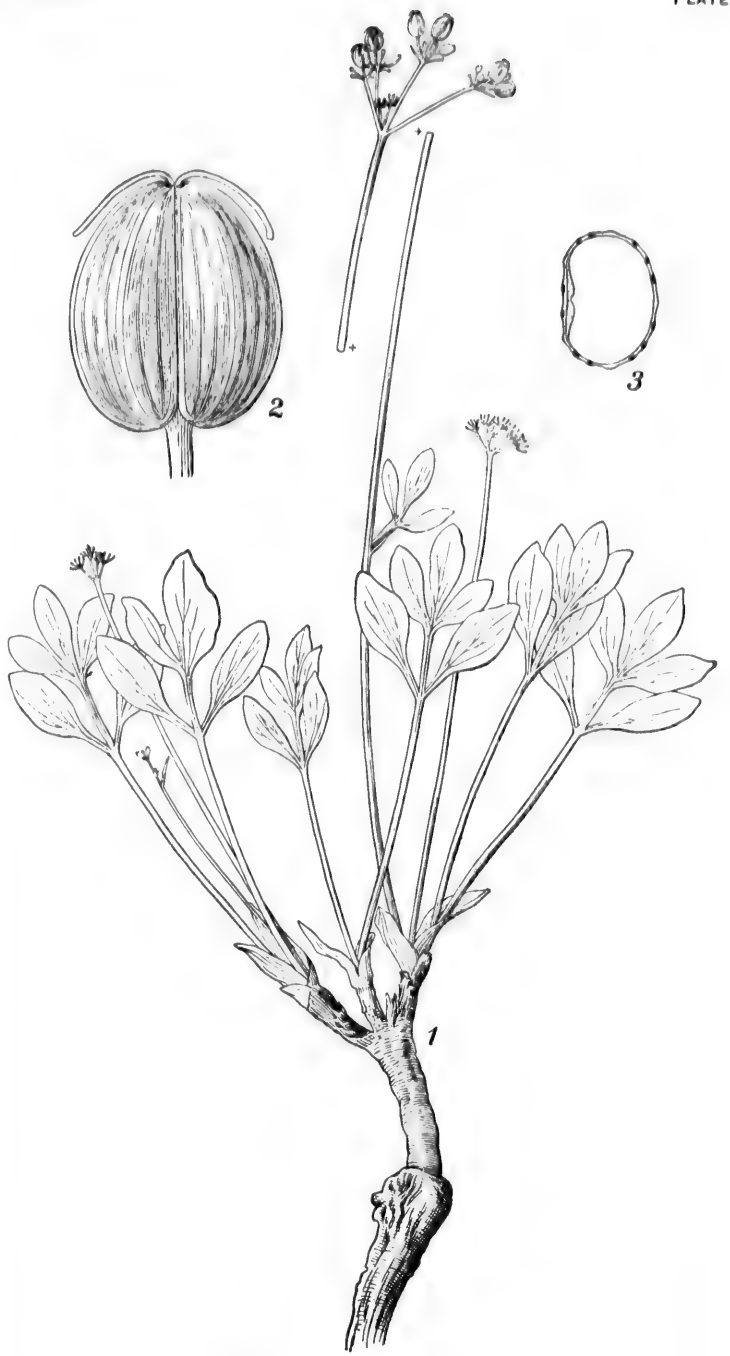


FIG. 13.—Musineon tenuifolium: *a*, ×8; *b*, ×10.

Glabrous or scabrous dwarf resiniferous dry-ground perennials, from thick elongated roots, acaulescent or dichotomously branching at base, with pinnately decompound leaves, no involucre, involucels of a few narrow bractlets and yellow flowers.



HESPEROGENIA STRICKLANDI C. & R.

Type species, *Seseli divaricatum* Pursh, Fl. **2**: 732. 1814.

A group of 4 species, three of which belong to western Canada and the United States as far south as Colorado, and one in the high mountains of southern Mexico.

Stems dichotomously branching from the base; leaf segments toothed.
Stems glabrous; fruit smooth, about 4 mm. long..... 1. *M. divaricatum.*
Stems scabrous; fruit scabrous, shorter and broader than in the former..... 2. *M. hookeri.*
Acaulescent, the simple peduncles much exceeding the leaves; leaf segments narrowly linear and entire..... 3. *M. tenuifolium.*

1. **Musineon divaricatum** (Pursh) C. & R. Bot. Gaz. **20**: 259. 1895.

Seseli divaricatum Pursh, Fl. **2**: 732. 1814.
Adorium lucidum Kuntze, Rev. Gen. Pl. **1**: 264. 1891.

Decumbent, glabrous; leaves bipinnatifid, with winged rachis; segments 3 to 5-toothed; peduncles 5 to 12.5 cm. long; umbel 10 to 25-rayed; rays 6 to 18 mm. long; pedicels short; fruit smooth, about 4 mm. long; oil tubes 3 in the intervals, with accessory ones beneath the ribs, 4 on the commissural side; seed terete, with rather deeply concave face.

Type locality, "in upper Louisiana;" collected by *Bradbury;* type in Herb. Philad. Acad.

From Alberta and Assiniboia to Montana, western Nebraska, and Colorado.

Specimens examined:

ALBERTA: Lethbridge, *Macoun* 4972, June 5, 1894.

ASSINIBOIA: Old Wives Creek, *Macoun* 10658, June 2, 1895.

MONTANA: Near Helena, *Kelsey* 263, in 1889; Great Falls, *Williams* 16, June 24, 1892.

WYOMING: Yellowstone Park, altitude 1860 meters, *Burglehaus*, June, 1893; Laramie County, *Nelson* 2875, May 14, 1897; Glen Creek, Yellowstone Park, *A. & E. Nelson* 5568, June 29, 1899.

NORTH DAKOTA: Fort Buford, *Havard*, May–June, 1889.

SOUTH DAKOTA: Black Hills, *Forwood*, in 1887; same region, altitude 1050 meters, *Rydberg* 719, June 23, 1892; Alkali Creek, *V. Bailey* 17, June 3, 1894.

NEBRASKA: Minden, Kearney County, *Hapeman.*

COLORADO: Near Denver, *Alice Eastwood*, in 1891; near Windsor, *Osterhout*, June, 1894 and 1895; near Denver, *Bethel*, in 1895 and 1898; near Fort Collins, *Baker* 6, May, 1896.

2. **Musineon hookeri** (Torr. & Gray) Nutt. in Torr. & Gray, Fl. **1**: 642. 1840.

Musenium divaricatum hookeri Torr. & Gray, Fl. **1**: 642. 1840.
M. trachyspermum Nutt. in Torr. & Gray, l. c.
M. angustifolium Nutt. in Torr. & Gray, l. c.

Resembling *M. divaricatum*, but more or less scabrous throughout; fruit scabrous, smaller, 2 to 3 mm. long, with more prominent ribs; oil tubes mostly solitary in the intervals, often with smaller accessory ones in the intervals or beneath the ribs, two on the commissural side; seed sulcate beneath the oil tubes, with more shallow concavity.

Type locality, "plains of the Upper Platte, near the Rocky Mountains;" collected by *Nuttall;* type in Herb. Philad. Acad.

From Assiniboia to Montana, Black Hills of South Dakota, and Colorado.

Specimens examined:

ASSINIBOIA: Moose Jaw, *Macoun* 10659, May 19, 1895.

MONTANA: Grasshopper Valley, *Watson* 154, July 23, 1880; near Helena, *Kelsey*, May 21, 1888; *Blankinship* 23, May 4, 1890; near Red Lodge, *Rose* 8, July 24, 1893; Pole Creek, *Rydberg* 4615, July 4, 1897.

WYOMING: *Alden;* Yellowstone Park, *Tweedy* 853, June, 1885; Laramie, *Nelson* 10, May 7, 1894.

SOUTH DAKOTA: Black Hills, *Forwood* 144, June 9, 1887.

COLORADO: *Hall & Harbour* 214, in 1862; plains, *Vasey*, in 1868; Apex, *Wolf* 726, in 1873; foothills, altitude 1,800 meters, *Coulter* 185, May 11, 1895.

3. **Musineon tenuifolium** Nutt. in Torr & Gray, Fl. **1**: 642. 1840.

FIG. 13.

Acaulescent, somewhat cespitose, glaucous; leaves tripinnatifid, with narrowly linear segments; peduncles much longer than the leaves, 1 to 2 dm. long; umbel 12 to 20-rayed; fruit nearly glabrous, 3 to 4 mm. long; oil tubes large, 2 or 3 in the intervals.

Type locality, "Rocky Mountains;" collected by *Nuttall;* type in Herb. Philad. Acad. and Herb. Columbia Univ.

Western Nebraska, western South Dakota, and Wyoming.

Specimens examined:

NEBRASKA: Dawes County, altitude 1,380 meters, *Bessey*, June 29, 1889; Sioux County, *Webber*, August 2, 1889; War Bonnet Canyon, altitude 1,560 meters, *Williams* 308, June 23, 1890; Cheyenne County, *Rydberg*, July 4, 1891; Scotts Bluff County, *Rydberg*, July 6, 1891.

SOUTH DAKOTA: Black Hills, *Forwood* 146, May 5, 1887; same region, altitude 1,050 to 2,100 meters, *Rydberg* 718, June 1892.

WYOMING: Laramie Hills, *Nelson* 176, June 7, 1894; Lusk, *Knowlton* 108, June 28, 1896; Laramie and Albany counties, *Nelson* 2878, 3168, in 1897.

4. **Musineon vaginatum** Rydberg, Mem. N. Y. Bot. Garden **1**: 288. 1900.

"Stem less than 1 dm. high, from a thick perennial root, glabrous, striate, more or less purple-tinged, 2 to 3-leaved; basal leaves with petioles about 5 cm. long, twice or thrice ternate, with stalked divisions (stalk of the terminal one longest), glabrous; divisions divided into linear or linear-oblong obtuse segments about 5 mm. long; stem leaves similar, short petiolate, and with a very conspicuous purple and scarious-margined sheath; umbel 1 to 2 cm. in diameter, with several rays; involucre none; involucels of linear bracts nearly as long as the pedicels; sepals evident; petals white or sometimes yellowish; mature fruit not seen; young fruit with strong angles, but no wings, a little compressed laterally; oil tubes apparently 3 in the intervals; seed face plane; stylopodium depressed."

Type locality, "Montana, Bridger Mountains;" collected by *Rydberg & Bessey*, no. 4626, June 15, 1897; type in Herb. Columbia Univ., duplicate in U. S. Nat. Herb.

Bridger Mountains, Montana.

Specimens examined:

MONTANA: Type specimens as cited under type locality; same station and date, *Rydberg & Bessey* 4625; *Flodman* 695, in 1897.

We quote the original description of this species, as the material does not permit to determine the genus to which it belongs. Fruiting specimens of what appears to be this species were collected by Mr. Frank Tweedy in the Big Horn Mountains of Wyoming in 1899. The fruit is oblong, 3 mm. long, flattened laterally, the surface slightly roughened, and with no stylopodium.

15. **DEWEYA** Torr. & Gray, Fl. 1: 641. 1840.

Calyx teeth prominent. Fruit oblong, flattened laterally, glabrous. Carpel with 5 prominent very acute ribs. Stylopodium none. Carpophore divided. Oil tubes several in the intervals and on the commissural side. Seed nearly terete in section, the face deeply sulcate.

Caulescent plants, with simply pinnate leaves, mostly no involucre, involucels of few linear bractlets, and yellow flowers.

Type species, *Deweya arguta* Torr. & Gray.

A monotypic genus, so far as known, belonging to the mountains of southern California and Lower California.

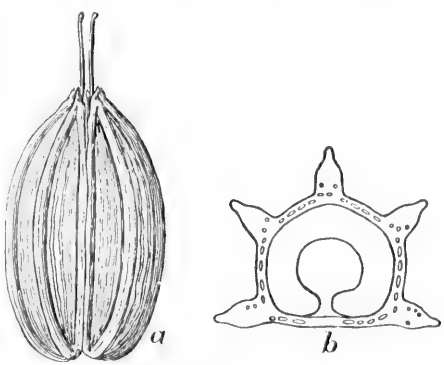


FIG. 14.—Deweya arguta: *a*, × 4; *b*, ×8.

The genus *Deweya* has been referred to *Velaea* and to *Arracacia*, which two genera are now merged under the latter name, but differs chiefly in its lack of stylopodium and pinnate leaves. Its relationship is nearest to *Tauschia*, from which it differs in its very sharp prominent ribs, prominent and persistent calyx teeth, as well as in its range. Drude in Engler & Prantl's *Nat. Pflanzfam.* has associated *Deweya* with *Museniopsis* as subgenera under *Velaea*, but it is more clearly distinct from *Museniopsis* than from *Tauschia*. In our *Rev. N. Am. Umbell.* we were led to associate with *D. arguta* certain other species which had been described under the genus, and which had gradually come to stand for it. Accordingly *D. arguta* came to be regarded as an exceptional species, rather than the type of the genus. We have here maintained *Deweya* as at first established, and have separated from it the subsequently described species as representing a genus more distinct from *Deweya* than is *Deweya* from *Tauschia*.

1. **Deweya arguta** Torr. & Gray, Fl. 1: 641. 1840. FIG. 14.

Ligusticum argutum Nutt. in Torr. & Gray, Fl. 1: 641. 1840.
Arracacia arguta Watson, Bibl. Index 419. 1878.
Velaea arguta C. & R. Rev. N. Am. Umbell. 120. 1888.
V. arguta ternata C. & R. Bot. Gaz. 14: 282. 1889.

Glabrous, 3 to 7.5 dm. high, rarely acaulescent; leaves simply pinnate, petiolules of lowest pair of leaflets sometimes prominent enough to give a ternate appearance; leaflets 5 to 7, ovate, 2.5 to 7.5 cm. long, the lowest petiolulate and often subcordate, finely and sharply mucronate serrate, the terminal and lowest often 3-lobed; umbel 12 to 16-rayed, mostly with no involucre, and involucels of few linear acuminate bractlets; rays 5 to 9 cm. long; pedicels short, 3 to 10 mm. long; fruit oblong, smooth, 8 mm. long; oil tubes 3 to 5 in the intervals, 4 to 6 on the commissural side.

Type locality, "woods of San Diego, California;" collected by *Nuttall;* type in Philad. Acad.

Mountains of southern California and Lower California.

Specimens examined:

CALIFORNIA: San Bernardino, *G. R. Vasey* 226, May, 1880; Pasadena, *Jones* 3027, February, 1882; Los Angeles County, *Hasse*, March–April, 1886, 1888; San Diego County, *Orcutt*, July, 1889; Santa Monica, *Hasse*, May, 1892; San Isabel, *Henshaw*, April–May, 1893; San Bernardino, *Parish* 4470, June, 1897.

16. **DRUDEOPHYTUM** C. & R., gen. nov.

Calyx teeth evident or wanting. Fruit orbicular, flattened laterally, glabrous, or pubescent. Carpel with 5 slender filiform ribs. Stylopodium none. Carpophore variable. Oil tubes several in the intervals and on the commissural side. Seed nearly terete in section, the face with a narrow deep sulcus which enlarges into a central cavity.

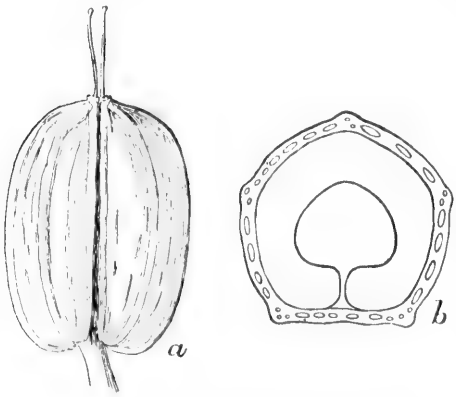


FIG. 15.—Drudeophytum hartwegi: *a*, ×4; *b*, ×8.

Caulescent or acaulescent plants, with ternately compound leaves (except in *D. restitum*), mostly no involucre, more or less prominent involucels, and yellow flowers (except in *D. restitum?*).

Type species, *Deweya hartwegi* Gray, Proc. Am. Acad. **7**: 342. 1868.

A group of 6 species, belonging to the mountains of the Pacific slope, from southern California to central Oregon.

The species placed here under *Drudeophytum* have been heretofore associated with *Deweya arguta*, as mentioned in the discussion under that genus. *Drudeophytum* differs from *Deweya*, however, in having orbicular fruit, with slender filiform ribs and ternate leaves.

Glabrous or sometimes scabrous; leaves ternate; flowers yellow; sterile flowers without calyx teeth.

Calyx teeth obsolete.
Foliage more or less scabrous.
Involucels conspicuous; fruit large ..... 1. *D. hartwegi.*
Involucels inconspicuous; fruit small ..... 2. *D. kelloggii.*
Foliage glabrous and glaucous ..... 3. *D. glaucum.*
Calyx teeth evident.
Umbels large and open; southern California ..... 4. *D. parishii.*
Umbels contracted; mountains of Oregon ..... 5. *D. howellii.*
Densely clothed with soft pubescence; leaves pinnate; flowers white; sterile flowers on long pedicels, and with prominent persistent calyx teeth. 6. *D. restitum.*

1. **Drudeophytum hartwegi** (Gray) C. & R. FIG. 15.

Dewega hartwegi Gray, Proc. Am. Acad. **7**: 342. 1867.
Arracacia hartwegi Watson, Proc. Am. Acad. **22**: 415. 1887.
Velaea hartwegi C. & R. Rev. N. Am. Umbell. 121. 1888.

Mostly acaulescent, 3 to 6 dm. high, minutely scabrous throughout; leaves biternate and quinate (ultimate segments more or less confluent); leaflets ovate, 2.5 to 5 cm. long, acute at base, coarsely and deeply mucronate-serrate and lobed; umbel 16 to 20-rayed, mostly with no involucre, and involucels of prominent foliaceous linear oblong reflexed bractlets on one side of the umbellets; rays 6 to 10 cm. long; pedicels short, 1 to 7 mm. long; fruit nearly orbicular, smooth, 6 to 8 mm. long, 5 to 6 mm. broad; carpophore entire; oil tubes 3 in the dorsal intervals, 5 or 6 in the laterals, 8 to 10 on the commissural side.

Type locality, "on the Sacramento," California; collected by *Hartweg*, no. 1748; type in Herb. Gray.

California.

Specimens examined:

CALIFORNIA: San Luis Obispo, *Jones* 3238, May 6, 1882; near Fort Tejon, Kern County, altitude 1,000 meters, *Coville & Funston* 1157, July 2, 1891; Amador County, *Hansen* 900, April 6, 1893; Little Chico Canyon, Butte County, *Mrs. Austin* 866, March–June, 1896; Mount Diablo, *Alice Eastwood*, May 31, 1897; Morrison Canyon, Niles, *Jepson*, June 19–20, 1897.

2. **Drudeophytum kelloggii** (Gray) C. & R.

Dewega kelloggii Gray, Proc. Am. Acad. **7**: 343. 1867.
Arracacia kelloggii Watson, Proc. Am. Acad. **22**: 415. 1887.
Velaea kelloggii C. & R. Rev. N. Am. Umbell. 121. 1888.

Acaulescent, or nearly so, mostly puberulent, more slender, 3 to 6 dm. high; leaves triternate; leaflets ovate, 1 to 3.5 cm. long, mostly 3-lobed; umbel 8 to 16-rayed, mostly with no involucre, and involucels of small linear bractlets; rays 2.5 to 7.5 cm. long; pedicels 6 to 8 mm. long; fruit 2 to 4 mm. long, almost as broad, somewhat notched at base; otherwise like *D. hartwegi*.

Type locality, "Bolinas Bay, near San Francisco;" collected by *Dr Hogg*, June 23; type in Herb. Gray.

California and Oregon.

Specimens examined:

CALIFORNIA: Oakland Hills, near San Francisco, *Kellogg & Harford*, in 1868; same station, *Kellogg*, June, 1870; Crystal Springs, *G. R. Vasey*, in 1875; Folsom, *Katharine Curran*, May, 1883; summit of Mount Tamalpais, *Katharine Curran*, July 4, 1886; Kaweah, Tulare County, *Alice Eastwood*, May, 1894; Sequoia Mills, Fresno County, *Alice Eastwood*, May, 1894; Mount Tamalpais, Marin County, *Alice Eastwood*, in 1894 and 1896.

OREGON: Waldo, *Howell*, May 30, 1884.

3. **Drudeophytum glaucum** C. & R. PLATE II.

Velaea glauca C. & R. Contr. Nat. Herb. **3**: 321. pl. 14. 1895.

Short caulescent, slender, 4.5 dm. or less high, erect or somewhat spreading, glabrous and somewhat glaucous; basal leaves small, twice or thrice ternate; stem leaves often simply ternate; leaflets small, 12 mm. or less long, mostly cordate or truncate at base, often 3-lobed or 3-parted, irregularly toothed; umbel 7 to 15-rayed, with no involucre, and involucels of small linear bractlets; rays 2.5 to 5 cm. long; pedicels 2 mm. or less long; fruit orbicular, 2 mm. in diameter; carpophore parted below the middle.

Type locality, "Glendale," Oregon; collected by *Howell*, April 30, 1887; type in U. S. Nat. Herb.

Southern Oregon.

Specimens examined:

OREGON: Canyonville, *Howell*, April, 1881; Glendale, *Howell*, April 30, 1887.

EXPLANATION OF PLATE II.—Fig. *a*, umbel; *b*, fruit.

4. **Drudeophytum parishii** C. & R.

Velaea parishii C. & R. Rev. N. Am. Umbell. 121. 1888.

Glabrous throughout, nearly acaulescent, 3 to 4 dm. high; leaves thickish, ternate-pinnatifid, the segments ovate, irregularly cuspidate-toothed and lobed; umbel about 20-rayed, with no involucre, and involucels of few setaceous bractlets; rays 5 to 7.5 cm. long; pedicels about 4 to 7 mm. long; calyx teeth prominent; fruit oblong, glabrous, 6 to 7 mm. long; carpophore 2-parted; oil tubes 3 or 4 in the intervals, 4 or 5 on the commissural side.

Type locality, north side of "San Bernardino Mountains," California; collected by *Parish Bros.*, no. 1827, June, 1886; type in Herb. Coulter.

Southern California.

Specimens examined:

CALIFORNIA: Type specimens as cited under type locality; Long Meadow, Tulare County, *Palmer* 169, July 7–14, 1888; near Tejon Pass, Kern County, *Coville & Funston* 1222, July 12, 1891; San Jacinto Mountains, San Diego County, altitude 1,800 meters, *Hasse*, July, 1892; Wilsons Peak, Los Angeles County, *Davidson*, July, 1892; San Bernardino Mountains, altitude 1,500 to 1,950 meters, *Parish* 3006, 3504, June, 1894.

5. **Drudeophytum howellii** C. & R.

Velaea howellii C. & R. Rev. N. Am. Umbell. 122. 1888.

Glabrous throughout, short caulescent, 5 to 7.5 cm. high; leaves 1

DRUDEOPHYTUM GLAUCUM C. & R.

or 2, thickish, 3 to 4 cm. long, with ovate outline; the oblong segments with irregular teeth and lobes, which are pungently tipped, and revolute margins; umbel 3 to 6-rayed (sometimes with 1 or 2 sessile umbellets), with no involucre, and involucels exceedingly prominent, being exactly like the leaves and forming the principal part of the foliage of the plant; rays 10 to 16 mm. long; pedicels about 2 mm. long; calyx teeth prominent; fruit (immature) oblong, glabrous, 2 mm. long; oil tubes several in the intervals.

Type locality, "top of Siskiyou Mountains, Oregon;" collected by *Howell*, no. 711, July 20, 1887; type in Herb. Coulter, duplicate in U. S. Nat. Herb.

Alpine summits of Siskiyou Mountains, Oregon.

Specimens examined:

OREGON: Siskiyou Mountains, near Ashland, *Howell* 1366, July 19–20, 1887.

A very rare and restricted species, which does not seem to have been found since the original collection.

6. **Drudeophytum vestitum** (Watson) C. & R.

Devega vestita Watson, Proc. Am. Acad. **17**: 374. 1882.
Arracacia vestita Watson, l. c. **22**: 415. 1887.
Velaea vestita C. & R. Rev. N. Am. Umbell. 122. 1888.

Acaulescent, 5 to 10 cm. high, densely clothed throughout with white soft spreading hairs; leaves pinnately compound, with numerous crowded confluent oblong segments; umbel 10 to 15-rayed, with no involucre, and involucels of numerous lanceolate bractlets; rays 8 to 16 mm. long; fruit sessile or nearly so, the sterile pedicels 12 to 18 mm. long; fruit ovate-oblong, pubescence 4 to 5 mm. long, 2 mm. broad; oil tubes 3 or 4 in the intervals, 3 on the commissural side.

Type locality, "summit of Mount Baldy, near San Bernardino," California; collected by *Parish Bros.*, August, 1880; type in Herb. Gray.

Mountains of southern California.

Specimens examined:

CALIFORNIA: Bear Valley, altitude 1,500 meters, *Parish* 1825, June, 1886; Long Meadow, Tulare County, altitude 2,400 to 2,700 meters, *Palmer* 193, June 7–14, 1888; near Whitney Meadows, altitude 2,850 meters, *Coville & Funston* 1628, August 20, 1891; Mount Whitney, altitude 3,300 to 3,900 meters, *Katharine Brandegee* 1479.

17. **MUSENIOPSIS** C. & R. Rev. N. Am. Umbell. 26 and 123. 1888.

Calyx teeth obsolete. Fruit flattened laterally, oblong, glabrous. Carpel somewhat flattened laterally, with equal filiform ribs (the intermediates somewhat distant from the laterals), and a thin pericarp with ill-defined strengthening cells beneath the ribs. Oil tubes 3 or 4 in the intervals, 4 on the commissural side. Seed terete, the face with a deep and narrow sulcus.

Glabrous perennials from thick elongated roots, with basal pinnate

leaves, no involucre, involucels of few small bractlets, and yellow flowers (in ours).

Type species, *Tauschia texana* Gray.

A Mexican genus of about 20 species, one of which reaches Texas.

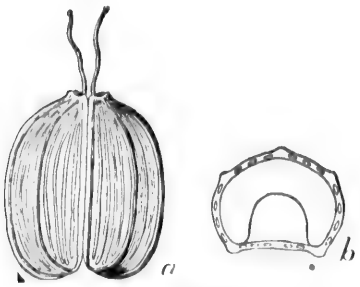


FIG. 16.—Museniopsis texana: *a*, *b*, ×8.

1. **Museniopsis texana** (Gray) C. & R., Rev. N. Am. Umbell. 123. 1888. FIG. 16.

Tauschia texana Gray, Bost. Jour. Nat. Hist. **6**: 211. 1850 (Pl. Lindh.).
Eulophus texanus Benth. & Hook. Gen. Pl. **1**: 885. 1867.
Velaea texana Drude in Engler & Prantl. Nat. Pflanzenfam. **3**[8]: 169. 1898.

Acaulescent; scape 5 to 20 cm. high, longer than the leaves, somewhat scabrous at base of umbels; leaves 5 to 7-pinnate; lower pinnæ petiolate, pinnately parted; segments cuneiform, 3 to 5-cleft; umbel 5 to 8-rayed; fruit 3 mm. long.

Type locality, "western Texas, near Austin?;" collected by *Wright;* type in Herb. Gray.

Texas, and extending into Mexico.

Specimens examined:

TEXAS: Industry, *Warzlow*, May, 1895.

18. BUPLEURUM L. Sp. Pl. 1: 236. 1753.

Calyx teeth obsolete. Fruit oblong, flattened laterally, with rather broad commissure. Carpel with equal very slender or prominent ribs, each with a very small group of strengthening cells. Stylopodium prominent and flat. Oil tubes wanting, or continuous about the seed cavity. Seed face plane or somewhat concave.

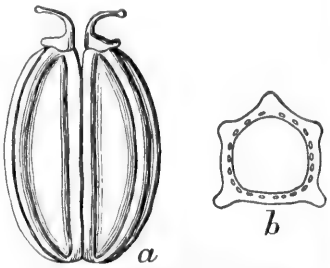


FIG. 17.—Bupleurum americanum: *a*, ×8; *b*, ×12.

Annuals or perennials, with simple entire clasping or perfoliate stem leaves, with or without an involucre, involucels of 5 or more ovate bractlets, and yellow flowers.

First species cited, *B. rotundifolium* L.

A group of 60 or more species, all but one belonging to the Old World.

The genus includes species of very diverse characters, and the description given above applies only to those included in our flora.

Perennial, from a branching caudex; involucre of 3 to 5 unequal bracts; involucels of 5 to 8 rather small ovate bractlets; carpel with prominent ribs; oil tubes continuous about the seed cavity, and one in each rib; seed face plane. 1. *B. americanum.*

Annual; involucre none; involucels of 5 very conspicuous ovate mucronate bractlets; carpels with very slender ribs and no oil tubes; seed face somewhat concave (see p. 252) ..... *B. rotundifolium.*

1. **Bupleurum americanum** C. & R. Rev. N. Am. Umbell. 115. 1888. Fig. 17.

Basal leaves linear-lanceolate; cauline ones very variable, oblong to linear, more or less clasping; rays unequal, 1.5 to 5 cm. long; pedicels short.

From Alaska to Montana, Idaho, and Wyoming.

Specimens examined:

Alaska: Fort St. Michael, Norton Sound, *Bannister*, in 1865–66; same station, *Turner* 8, August 14, 1879; Herald Island, *Captain Hooper*, in 1881; above Fort Yukon, *Bates*, in 1881; *Funston* 147, in 1893; Yukon region, *Williams*, in 1899; Yakutat Bay, *Saunders* 4114, July 12, 1899.

Alberta: Waterton Lake, *Macoun* 10670, July 28–31, 1895.

Montana: Valley of Musselshell River, *Canby*, August 19, 1882; Belt Mountains, *Anderson*, September, 1889; same station, *Williams* 197, September 7, 1890; near Red Lodge, *Rose* 46, July 27, 1893; Beartooth Mountains, above timber line, *V. Bailey* 37, August 13, 1894; near Geyser, Cascade County, *Ward* 140, August 27, 1895; Spanish Basin, Madison Range, altitude 1,800 meters, *Flodman* 682, July 11, 1896; Little Belt Mountains, altitude 1,800 meters, *Flodman* 683, 684, August 16–18, 1896.

Idaho: Mountains at head of Redfish Lake, altitude 2,550 to 3,000 meters, *Evermann* 446, August 22, 1895.

Wyoming: *Coulter*, in 1872; Green River, *Richardson*, in 1878; mountains of Yellowstone Park, *Knowlton*, August 15, 1887; *Evermann*, in 1893; north-western Wyoming, *Rose* 341, September 6, 1893; Teton Mountains, *Nelson* 972, August 21, 1894; Union Pass, *Nelson* 893, August 14, 1894; Electric Peak, Yellowstone Park, *Rydberg* 4600, August 18, 1897.

For introduced species, see page 252.

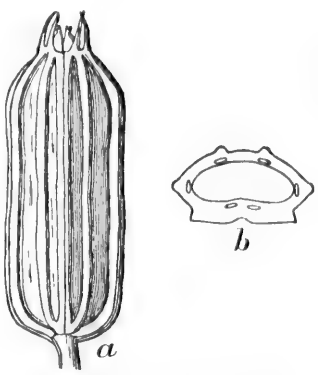


Fig. 18.—Trepocarpus aethusae: *a*, × 12; *b*, × 10.

19. **TREPOCARPUS** Nutt. in DC. Coll. Mém. 5: 56. 1829.

Calyx teeth prominent, unequal. Fruit linear-oblong, flattened laterally, smooth. Carpel somewhat dorsally flattened, with no primary ribs, 4 prominent corky secondary ribs, and a broad conspicuous band of strengthening cells about the seed cavity, making a thick crustaceous pericarp. Stylopodium conical, with very short style. Oil tubes solitary beneath the secondary ribs,

more or less imbedded in the seed and adhering to it, 2 on the commissural side. Seed face plane or somewhat concave.

Glabrous annuals, with thin pinnately decompound leaves and linear segments, lateral few-rayed umbels opposite the leaves, involucre and involucels of few linear entire or divided bracts, and white flowers.

A monotypic genus belonging to the southern prairie region of the United States.

1. **Trepocarpus aethusae** Nutt. in DC. Coll. Mém. **5**: 56. pl. 14. 1829. Fig. 18.

From 1 to 9 dm. high; umbels 2 to 5-rayed; umbellets few-flowered, with very short pedicels; fruit 8 to 10 mm. long.

Type locality, "territoire d'Arkansa"; collected by *Nuttall;* type in Herb. DC., duplicate in Herb. Philad. Acad.

Prairies of Arkansas and Indian Territory to Alabama and Texas.

Specimens examined:

Arkansas: Fort Smith, *Bigelow*, in 1853–54; near Little Rock, *Orville* 25, July 8, 1887; same station, *Mrs. Taft*, in 1888.

Indian Territory: Sans Bois Mountains, *Sheldon* 101, July 6, 1891.

Alabama: Near Mobile, *Mohr*.

Mississippi: Starkville, *Phares*, May, 1883.

Texas: Hempstead, *Hall* 258, June 10, 1872; near Dallas, *Reverchon*, June, 1879, 1880, and 1881; *Thurow*, in 1889.

20. APIUM L. Sp. Pl. 1: 264. 1753.

Calyx teeth obsolete. Fruit flattened laterally, ovate or broader than long, glabrous. Carpel with prominent obtuse nearly equal corky ribs and no strengthening cells. Stylopodium wanting or depressed. Oil tubes solitary in the intervals, 2 on the commissural side. Seed section round.

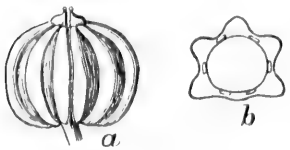


Fig. 19.—Apium ammi: *a*, × 10; *b*, × 12.

Erect or prostrate glabrous herbs with pinnately or ternately divided leaves and umbels of white flowers opposite the leaves.

First species cited is *A. petroselinum* L., which is a *Petroselinum;* the second species cited is *A. graveolens* L.

A group of about 20 species chiefly dispersed through the Eastern Hemisphere and represented in our native flora by a single widely distributed species.

1. **Apium ammi** (L.) Urban, Fl. Bras. **11**[1]: 341. pl. 91. 1879. Fig. 19.

Sison ammi L. Sp. Pl. **1**: 252. 1753; Jacq. Hort. Vindob. **2**: 95. pl. 200. 1772. *A. leptophyllum* F. Muell. in Benth. Fl. Austral. **3**: 372. 1866.

From 1 to 6 dm. high; leaves ternately divided into filiform segments; umbels sessile or short pedunculate; fruit 2 mm. long.

Type locality, "in Apulia, Ægypto."

In wet ground from North Carolina to Florida, westward to Texas and California; also extending into Mexico and South America.

Specimens examined:

SOUTH CAROLINA: Columbia, *Katherine Taylor.*

FLORIDA: East Florida, *Palmer* 196, in 1874; near Jacksonville, *Curtiss*, in 1875 and 1894.

TEXAS: Near Houston, *Hall* 245, 246, April 18, 1872; near Dallas, *Reverchon* 369, May, 1877; near Eagle Pass, *Havard*, May, 1883; Travis County, *Bodin*, September, 1891; Nueces County, *Heller* 1472, March 21, 1894.

CALIFORNIA: *Douglas*, in 1833.

In his publication of the combination *Apium ammi*, Urban referred the original *Sison ammi* to Jacquin, as though it might not be the same as *Sison ammi* of Linnaeus. This expression of doubt has led to the use of the second tenable specific name, *Apium leptophyllum* F. Muell. Upon examining the publication of Jacquin we discover that he had no doubt that he was dealing with the *Sison ammi* of Linnaeus, and cites several of the Linnaean references, both from Europe and Africa. The plant was figured by Shaw as early as 1738, and both Linnaeus and Jacquin cite Shaw's plate. There seems to be no reasonable doubt that Jacquin knew and used the *Sison ammi* of Linnaeus.

For introduced species, see page 253.

21. SPERMOLEPIS Raf. Neog. 2. 1825.

Leptocaulis Nutt. in DC. Coll. Mém. 5: 39. 1829.

Calyx teeth obsolete. Fruit ovate, flattened laterally, bristly or tuberculate. Carpel with somewhat prominent or obsolete ribs, thickish pericarp, and prominent groups of strengthening cells. Stylopodium conical, somewhat prominent. Oil tubes solitary in the intervals, 2 on the commissural side. Seed face plane.

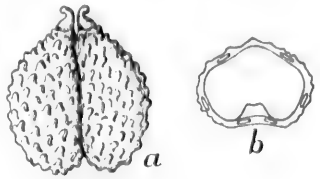


FIG. 20.—Spermolepis divaricatus: *a*, *b*. 12.

Very slender smooth branching annuals, with finely dissected leaves having filiform or linear segments, and small flowers in involucellate very unequally few-rayed pedunculate umbels.

Type species, *Daucus divaricatus* Walt. Fl. Car. 114. 1788.

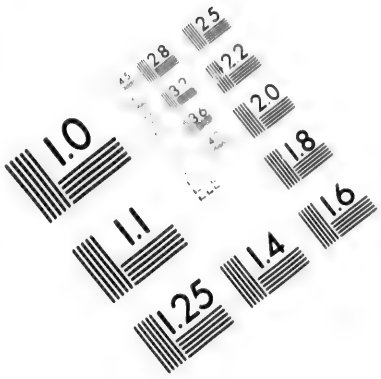
A genus of 2 species, belonging to the southern United States, from North Carolina and Florida to southern California, and extending into Mexico.

This genus is referred to *Apium* by Bentham & Hooker, who are followed by Drude in Engler & Prantl's *Nat. Pflanzenfamilien*, but in our judgment it deserves to remain as a distinct genus.

Fruit tuberculate ..... 1. *S. divaricatus.*
Fruit with hooked bristles ..... 2. *S. echinatus.*

1. **Spermolepis divaricatus** (Walter) Britton, Mem. Torr. Bot. Club 5: 244. 1894. FIG. 20.

Daucus divaricatus Walt. Fl. Car. 114. 1788.
Leptocaulis divaricatus DC. Coll. Mém. 5: 39. pl. 10, fig. a. 1829.
Leptocaulis diffusus Nutt. in DC. l. c.
Apium divaricatum Wood, Bot. & Flor. 140. 1870.



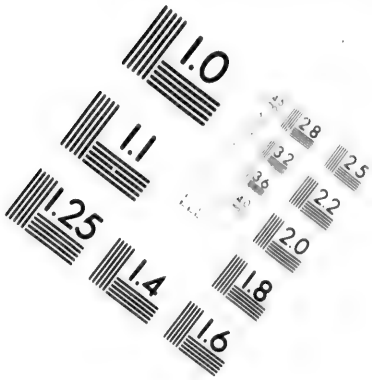
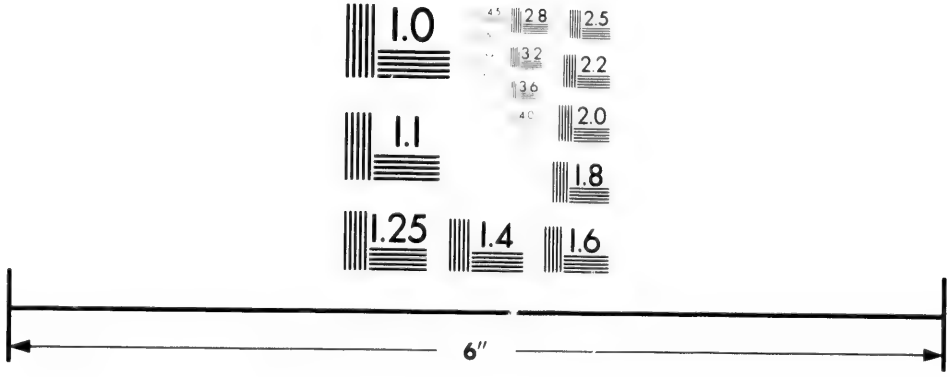
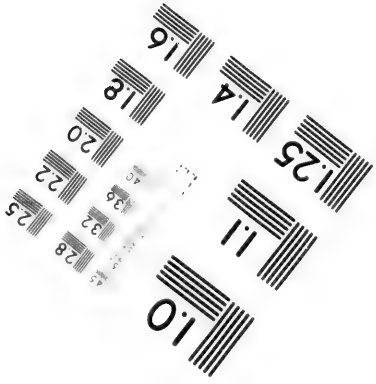
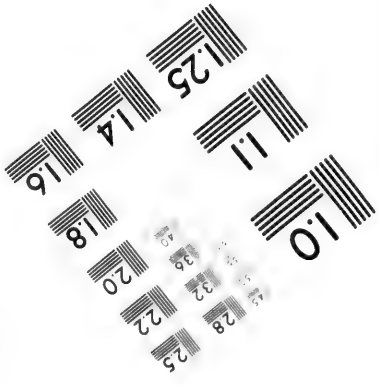


IMAGE EVALUATION TEST TARGET (MT-3)







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With spreading branches, 3 to 6 dm. high; umbels more diffuse than in *S. echinatus*, and usually with fewer rays; fruit tuberculate, about 1 mm. long, with rather broad commissure and somewhat prominent ribs.

Type locality not given, but presumably in the Carolinas.

North Carolina to Florida, west to Texas and Kansas.

Specimens examined:

FLORIDA: *Chapman;* Hibernia, *Canby*, March, 1869; near Jacksonville, *Curtiss*, in 1875; Cedar Keys, *Garber*, April, 1876; East Florida, *Mary C. Reynolds*, April, 1876; Duval County, *Fredholm*, March 30, 1893; near Jacksonville, *Curtiss* 4338, 4609, April, 1893 and 1894; Eustis, Lake County, *Nash* 392, April 1–15, 1894.

MISSISSIPPI: Ocean Springs, *Tracy*, April 10, 1890.

ARKANSAS: Fort Smith, *Bigelow*, in 1853–54.

KANSAS: Manhattan, Riley County, *Kellerman*.

INDIAN TERRITORY: Sapulpa, *Bush* 185, June 19, 1894.

OKLAHOMA: *Waugh* 199.

TEXAS: Houston, *Hall* 249, April 18, 1872; Dallas, *Reverchon* 367, 370, May, 1879 and 1880; Tom Green County, *Tweedy*, May, 1880; Kerr County, *Heller* 1773, May 14–21, 1894; Industry, *Wurzlow*, in 1895.

NEW MEXICO: Las Vegas, *Dewey*, June 24, 1891.

2. **Spermolepis echinatus** (Nutt.) Heller, Contr. Herb. Franklin & Marshall Coll. **1**: 3. 1895.

Leptocaulis echinatus Nutt. in DC. Prodr. **4**: 107. 1830.
Apium echinatum Watson, Bibl. Index 412. 1878.

Lower, 1 to 3 dm. high, and not so diffuse; fruit echinate with spreading hooked bristles with swollen tuberculate bases, about 1 mm. long, with rather narrow commissure and obsolete ribs.

Type locality, "Red River" [Arkansas]; collected by *Nuttall;* type (or duplicate) in Herb. Philad. Acad.

From Alabama to southern California, and extending into Mexico.

Specimens examined:

MISSISSIPPI: Petit Bois Island, *Tracy* 4926, May 8, 1898.

INDIAN TERRITORY: *Palmer* 148*a*, in 1868; Sapulpa, *Bush* 188, June 19, 1894.

TEXAS: Western Texas, *Wright* 1384, in 1852; Austin, *Hall* 251, May 17, 1872; Dallas, *Reverchon* 368, April, 1879 and 1881; Gillespie County, *Jermy* 142; Nueces County, *Heller* 1520, 1561, April 3–12, 1894.

NEW MEXICO: Carrizallilo Mountains, *Mearns* 37, April 20, 1892.

ARIZONA: Tucson, *Toumey* 195, March 26, 1892.

CALIFORNIA: Oakland Hills, *Lemmon*, in 1889.

For *Leptocaulis inermis* Nutt. see under *Apiastrum*.

22. AMMOSELINUM Torr. & Gray Pacif. R. Rep. **2**[4]: 165. 1855.

Calyx teeth obsolete. Fruit flattened laterally, ovate to ovate-oblong. Carpel with prominent equal more or less scabrous ribs; laterals closely contiguous to those of the other carpel, forming apparently a single broad rib; pericarp exceedingly hard, composed almost entirely of

strengthening cells. Styles very short. Oil tubes solitary in the intervals, 2 on the commissural side; all rather small and not close to the seed cavity. Seed dorsally flattened, with plane face.

Low diffuse annuals, with ternately divided leaves, the small ultimate segments linear to spatulate, involucre and involucels of entire or dissected bracts, and white flowers in small sessile or short pedunculate unequal umbels.

Type species, *A. popei* T. & G.

A genus of two species, largely restricted to Texas, but extending into western Kansas, Arizona, and Mexico.

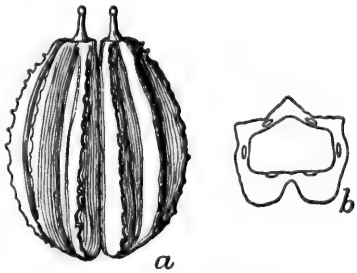

FIG. 21.—Ammoselinum popei: *a*, × 8; *b*, × 10.

Rough scabrous; fruit ovate-oblong, 4 to 5 mm. long.
Low, 1 dm. high ..... 1. *A. popei.*
Taller, 2 to 3 dm. high .. 2. *A. giganteum.*
Nearly glabrous; fruit ovate, 2 mm. long ..... 3. *A. butleri.*

1. **Ammoselinum popei** Torr. & Gray, Pacif. R. Rep. **2**[4]: 165. 1855. FIG. 21.

Apium popei Gray, Proc. Am. Acad. **7**: 343. 1867.

About 1 dm. high, with stem-angles, rays, pedicels, and ribs of fruit rough scabrous; leaf segments narrowly linear; fruit ovate-oblong, 4 to 5 mm. long, with thick corky commissure.

Type locality, "sandy soil, Llano Estacado and head waters of the Colorado;" collected by *Diffendorfer*; type in Herb. Gray.

In sandy soil, western Kansas to Texas, and extending into Mexico.

Specimens examined:

KANSAS: Southwestern Kansas, *Plank.*

TEXAS: Tom Green County, *Tweedy* 188, May, 1880; Brown County, *Reverchon* 1402, April, 1882; San Diego, *Mary B. Croft* 81, in 1884; Nueces County, *Heller* 1474, March 21, 1894.

2. **Ammoselinum giganteum** C. & R., sp. nov.

Much branched throughout and spreading, the branches 2 to 3 dm. long, angled and roughened; fruit ovate, 5 mm. long, with rather thin commissure, densely and sharply scabrous.

Type locality, mesas near Phœnix, Ariz.; collected by *C. G. Pringle*, no. 28, June 17, 1882; type in Herb. Gray.

Only known from type locality.

Specimens examined:

ARIZONA: Type specimens as cited under type locality.

Here perhaps belong specimens collected in the desert around Maricopa, Ariz., by L. H. Dewey, in June, 1894, except that the fruit is narrowly oblong and smaller. The material is rather fragmentary and should be collected in quantity by collectors in that region.

3. **Ammoselinum butleri** (Engelm.) C. & R. Bot. Gaz. **12**: 294. 1887.

Apium butleri Engelm. Proc. Am. Acad. **21**: 453. 1886.

Resembling *A. popei*, but smaller and nearly glabrous; leaf-segments narrowly oblong or spatulate; fruit ovate, about 2 mm. long, with ribs smooth or minutely scabrous, and corky commissure much less prominent.

Type locality, "Texas, in wet grounds near Houston"; collected by *Hall*, no. 244, March, 1872; type (or duplicate) in Herb. Gray. The type here given is the first specimen cited. Associated with it in the original description are *Reverchon*, near Dallas, Tex., and *Butler* in Indian Territory, south of the Arkansas.

In wet ground, Texas and adjacent Indian Territory.

Specimens examined:

TEXAS: Near Houston, *Hall* 244, March 20, 1872; near Harrisburg, *Joor* 122, March 16, 1876; near Dallas, *Reverchon* 366, March, 1878 and 1880; *Nealley*, in 1888; Hockley, Harris County, *Thurow*, March 23, 1889; near Galveston, *Bodin*, March 3, 1890; near Industry, *Wurzlow*, May, 1895; near Houston, *Rose* 4179, May 6, 1899.

23. ZIZIA Koch, Nov. Act. Caes. Leop. Acad. **12**: 128. 1824.

Calyx teeth prominent. Fruit flattened laterally, ovate to oblong, glabrous. Carpel with filiform ribs. Stylopodium wanting; styles long. Oil tubes large and solitary in the broad intervals, 2 on the commissural side, and a small one in each rib. Seed terete, sulcate beneath the oil tubes.

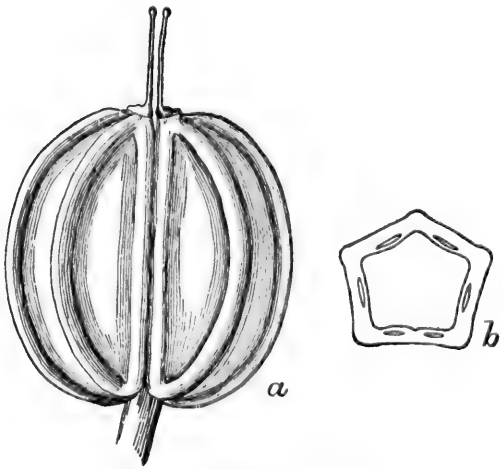

FIG. 22.—Zizia cordata: *a*, *b*, × 10.

Smooth perennials (3 to 9 dm. high) of open prairies and upland meadows, with simple to ternately compound leaves, no involucre, involucels of small bractlets, yellow flowers, and central fruit of each umbellet sessile.

Type species, *Smyrnium aureum* L.

A group of 3 species, belonging to the United States and Canada.

Basal leaves ternately divided.
- Stout plants with leaflets sharply serrate ..... 1. *Z. aurea*
- Slender plants with leaflets coarsely serrate or toothed ..... 2. *Z. bebbii*

Basal leaves simple ..... 3. *Z. cordata*

1. **Zizia aurea (L.)** Koch, Nov. Act. Caes. Leop. Acad. **12**: 129. 1824.

Smyrnium aureum L. Sp. Pl. **1**: 262. 1753.

Thaspium aureum apterum Gray, Man. ed. 2. 156. 1856.

Basal leaves very long-petioled, all but the uppermost leaves 2 to 3-ternate; leaflets ovate to lanceolate, sharply serrate; rays 15 to 25, stout, 2.5 to 5 cm. long; fruit oblong, about 4 mm. long.

Type locality, in "America borealis."

Throughout Canada and the Atlantic States, and extending west to Montana and eastern Texas.

Specimens examined: We cite but few of the numerous specimens examined.

MAINE: Aroostook County, *Fernald* 50, July 26, 1893.

VERMONT: Peacham, *Alice F. Stevens*, in 1892.

MASSACHUSETTS: Ipswich, *Oakes*.

CONNECTICUT: Fairfield, *Eames*, May 17, 1895.

NEW JERSEY: Passaic County, *Nash*, May–June, 1890.

DISTRICT OF COLUMBIA: High Island, *Pollard* 464, June 28, 1895.

VIRGINIA: Near Alexandria, *Ward*, May–June, 1878.

PENNSYLVANIA: Near Gap, *Small*, June 14, 1889.

NEW YORK: Oxford, *Coville*, June 23, 1887.

ILLINOIS: Near Chicago, *Babcock;* Naperville, *Umbach*, May 26, 1898.

MISSOURI: Eagle Rock, *Bush* 187, June 21, 1897; Atherton, *Bush*, June 27, 1898.

ARKANSAS: Fort Smith, *Bigelow*, in 1853–54.

INDIAN TERRITORY: Chickasaw Creek, *Sheldon* 73, June 26, 1891.

TEXAS: Near Dallas, *Hall* 252, June 28, 1872.

MINNESOTA: Near Minneapolis, *Sandberg* 269, June, 1891; Fort Snelling, *Mearns*, May 19, 1891.

NEBRASKA: Ponca, *Clements* 2567, June 16, 1893.

SOUTH DAKOTA: *Duffy* 78, in 1887.

MONTANA: Arrow Creek, *Williams*, September, 1886.

The following variety appeared while we were reading proof:

Zizia aurea obtusifolia C. H. Bissell, Rhodora, **2**: 255. 1900.

2. **Zizia bebbii** (C. & R.) Britton, Mem. Torr. Club **2**: 35. 1890.

Z. aurea bebbii C. & R. Bot. Gaz. **12**: 138. 1887.

Resembling *Z. aurea*, but more slender; basal leaves on slender and shorter petioles, twice to thrice ternate; leaflets broadly ovate to oblong, mostly obtuse, more coarsely serrate or even toothed; rays 2 to 8, slender, 5 to 10 cm. long; fruit mostly smaller, oval, 2 to 3 mm. long.

Type locality, "Virginia and North Carolina;" collected by *Canby*, August, 1876; type in Herb. Coulter.

From the mountains of Virginia and West Virginia to Tennessee and Georgia.

Specimens examined:

VIRGINIA: Salt Pond Mountain, *Canby*, August, 1890; Roanoke River, *Small & Heller* 218, June 2, 1891; Smyth County, altitude 600 meters, *Small*, June 23, 1892.

NORTH CAROLINA: Type specimen as cited under type locality; *Vasey*, in 1878; *Kelsey*, April, 1890.

West Virginia: Greenbrier County, altitude 750 to 1,020 meters, *Heller* 841, May 17, 1893; near Hinton, Summers County, and McGraw, Wyoming County, *Morris* 958, 1328, July 9 and August 23, 1900.
Tennessee: Cocke County, *Kearney* 701, August 26, 1897.

3. **Zizia cordata** (Walt.) Koch in DC. Prodr. **4**: 100. 1830. Fig. 22.

Smyrnium cordatum Walt. Fl. Car. 114. 1788.
Thaspium trifoliatum apterum Gray, Man. ed. 2. 156. 1856.

Basal leaves mostly long-petioled, cordate or even rounder, crenately toothed, very rarely lobed or divided; stem leaves simply ternate or quinate, the leaflets ovate to lanceolate, serrate, incised, or even parted; fruit ovate, 3 mm. long; seed section larger than in *Z. aurea*.

Type locality not given, but presumably in the Carolinas.

From eastern Canada to North Carolina and Alabama and extending westward to Assiniboia, Alberta, Washington, and Colorado.

Specimens examined: We cite but few of the numerous specimens examined.
Connecticut: Fairfield, *Eames*, September 26, 1895.
New Jersey: Granton, *Van Sickle*, June 3, 1895.
Maryland: Near Baltimore, *Foreman*, in 1875.
District of Columbia: Little Falls, *Vasey*, in 1873.
North Carolina: Asheville, *McCarthy*, May, 1888.
Alabama: Auburn, Lee County, *Earle & Baker*, May 7, 1898.
Tennessee: Lookout Mountain, Hamilton County, *Pollard & Maxon* 421, August 6, 1900.
Pennsylvania: Easton, *Porter*, September 25, 1891.
New York: Ithaca, *Pearce*, May 28, 1883.
Ohio: Lancaster, *Bigelow*.
Illinois: Near Chicago, *Babcock;* West Chicago, *Umbach*, July 9, 1898.
Missouri: Eagle Rock, *Bush* 191, June 6, 1897; Grain Valley, *Bush*, July 4, 1898.
Iowa: Minnesota line, *Pammel* 594, July 21, 1897.
Minnesota: Fort Snelling, *Mearns*, September 4, 1889.
South Dakota: Black Hills, *Forwood* 139, June 7, 1884.
Wyoming: Horse Creek, *Nelson* 34, June 6, 1893.
Colorado: South Park, *Wolf* 727, June, 1873.
Utah: Wahsatch Mountains, *Jones*, August, 1883.
Idaho: Forks of Wood River, *Henderson* 3406, July 25, 1895.
Washington: Pullman, *Piper* 1557, July 24, 1893; same station, *Elmer* 890, May, 1897.
Assiniboia: Wood Mountain, *Macoun* 10680, June 14, 1895.
Alberta: Milk River, *Macoun* 10679, July 17, 1895.

24. HARBOURIA C. & R. Rev. N. Am. Umbell. 26 and 125. 1888.

Calyx teeth evident. Fruit flattened laterally, ovate, with narrow commissure (carpels appearing nearly distinct), tuberculate-roughened. Carpel (round in section) with equal broad obtuse very prominent ribs, a small group of strengthening cells in each; the narrow commissure prominently corky-thickened, partly divided by a groove. Stylopodium depressed or wanting. Oil tubes large, solitary in the intervals, 2 on the commissural side. Seed section nearly round.

Glabrous perennials, with 1 to 3 leaves which are ternately decom-

pound and with narrowly linear or filiform segments, involucre and involucels of few subulate bracts, and long-peduncled umbels (mostly in pairs) of yellow flowers.

A monotypic genus, based on *Thaspium trachypleurum* Gray, belonging to the Rocky Mountain region of the United States.

1. **Harbouria trachypleura** (Gray) C. & R. Rev. N. Am. Umbell. 125. 1888. FIG. 23.

Thaspium trachypleurum Gray, Proc. Acad. Philad. 1862: 63. 1863.

Cicuta trachypleura Watson, Bibl. Index 417. 1878.

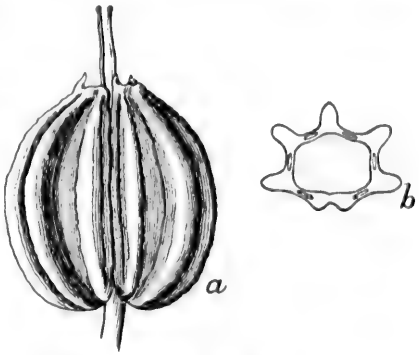

FIG. 23.—Harbouria trachypleura: *a*, *b*, × 8.

From 3 to 6 dm. high; leaf segments mucronulate; umbels (mostly 2 long-peduncled ones) 15 to 25-rayed; rays 1 to 2.5 cm. long; pedicels 4 to 6 mm. long; fruit 4 mm. long.

Type locality, "on the mountains at middle and lower elevations," Colorado; collected by *Hall & Harbour*, no. 215, in 1862; type in Herb. Gray, duplicate in U. S. Nat. Herb.

In the foothills of Colorado, and extending into Wyoming and New Mexico.

Specimens examined:

COLORADO: *Hall & Harbour* 215, in 1862; St. Vrain Canyon, *Coulter*, May 26, 1873; Central City, *Alice Eastwood*, October, 1892; Morrison, *Bethel* 3612, June, 1895; Larimer County, *Osterhout*, July, 1895; Gore Mountains, altitude 2,850 meters, *Bethel* 3613, August, 1895; near Fort Collins, altitude 1,650 meters, *Baker*, May 24, 1896.

WYOMING: Laramie Hills, *Nelson*, May–June, 1893; Table Mountain, *Nelson* 160, June 2, 1894; Uinta County, *Stevenson* 31, July 17, 1894; Medicine Bow Mountains, Albany County, *Nelson* 3365, August 10, 1897.

25. CICUTA L. Sp. Pl. 1: 255. 1753.

Calyx teeth rather prominent. Fruit flattened laterally, oblong to orbicular, glabrous. Carpel with strong flattish corky ribs, the laterals largest (at least in section), without strengthening cells. Stylopodium low, sometimes low conical. Oil tubes solitary in the intervals, 2 on the commissural side. Seed nearly terete or somewhat dorsally flattened, with face from plane to slightly concave.

Smooth poisonous marsh perennials, with pinnately compound leaves and serrate leaflets, involucre of few bracts none, involucels of several slender bractlets, and white flowers.

First species cited, *C. virosa* L.

A genus of about 10 species, chiefly North American, one species being Mexican, another (the type) European.

Immediately following our Revision, in which but three North American species of *Cicuta* were recognized, Professor Greene (Pittonia **2**:1–11. 1889) revised the genus, disclaiming the presence of *C. virosa* L. in our flora, and segregating several western species. After a study of very much more abundant material, we have concluded that his points are well taken, and the following presentation follows largely the lines which he proposed. In his revision Professor Greene laid special stress upon characters supplied by the rootstocks and roots, and proposed the following key:

*Root axis very short, nearly or quite erect, not enlarged, its partitions crowded.

+ Roots all alike, slender fibrous.

C. virosa.

+ + Main roots coarse, elongated, fleshy fibrous.

C. bolanderi, C. occidentalis, C. purpurata [*douglasii*].

+ + + Main roots oval or oblong, fleshy tuberiform.

C. maculata [and *curtissii*], *C. bulbifera.*

**Rhizomatous species; the root axis greatly enlarged, horizontal, only partly or not at all subterranean, emitting fibrous roots from beneath.

C. vagans, C. californica.

We reproduce the above key in the hope that it may be further tested in the field, for with the material at our command we have not been able to follow it fully. While we recognize in Professor Greene's typical material the differences suggested, we do not find them constant. The fleshy thickening of the rootstocks and their direction, as well as the thickness and elongation of the roots, seem to vary with the nature of the substratum, as might be expected. Nevertheless, we find that the differences thus suggested to Professor Greene have served to call attention to what seem to us better characters upon which to base his species.

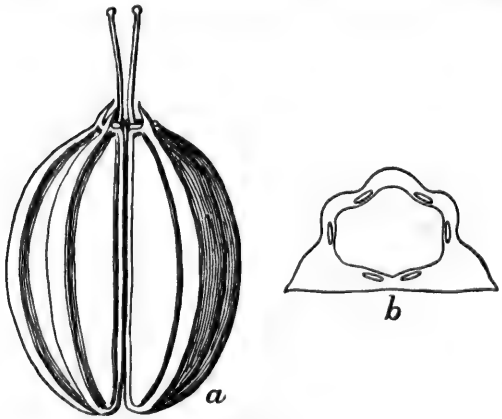

FIG. 24.—Cicuta maculata: *a*, *b*, ×8.

Aside from the curious bulbiferous habit of *C. bulbifera*, the other species seem to be best grouped primarily by their oblong or orbicular fruits, further separation being made upon differences in the fruit ribs and in the foliage.

We have included, chiefly under *C. occidentalis*, several forms which we do not feel justified in separating, but which better and more abundant material may prove to be worthy of independent rank.

Axils of leaves bearing no bulblets.

Fruit orbicular.

Leaves simply pinnate..... 1. *C. californica.*

Leaves twice to thrice pinnate.

Ribs very broad; oil-tubes very narrow.

Leaflets thickish, lanceolate to ovate-lanceolate, closely and sharply toothed or even cleft, strongly reticulate beneath ..... 2. *C. douglasii.*

Leaflets thinner, linear-lanceolate to lanceolate, not so closely or sharply serrate, not strongly reticulate beneath..... 3. *C. vagans.*

Ribs narrower; oil-tubes broad.
Leaflets linear-lanceolate; Californian ..... 4. *C. bolanderi.*
Leaflets lanceolate to oblong-lanceolate; southeastern United States, 5. *C. curtissii.*

Fruit oblong.
Fruit not constricted at the commissure; lateral ribs much the largest; eastern, 6. *C. maculata.*
Fruit constricted at the commissure; ribs approximately equal in surface display; Rocky Mountain region..... 7. *C. occidentalis.*
Axils of upper leaves bearing bulblets..... 8. *C. bulbifera.*

1. **Cicuta californica** Gray, Proc. Am. Acad. **7**: 344. 1867.

C. virosa californica C. & R. Rev. N. Am. Umbell. 130. 1888, as to name, not as to specimen.

Rather stout and erect, 9 to 15 dm. high; rootstock "freely branching," abruptly enlarged beneath the aerial stem; leaves simply pinnate; leaflets lanceolate to ovate-lanceolate, 5 to 13 cm. long, rounded at base, serrate, often deeply lobed on the lower side; fruit broadly ovate, 3 mm. long, with approximately equal and prominent ribs, and narrow intervals.

Type locality, "Monterey," Cal.; collected by *Hartweg*, no. 1754; type in Herb. Gray. This is the first specimen cited, and associated with it are *Brewer* 707, and *Kellogg* from "San Francisco" (probably Oakland Hills).

Along the margins and in the shallow waters of mountain streams in the coast region of California from Mendocino County to Monterey County.

Specimens examined:
California: Mendocino County, *G. R. Vasey*, in 1875; Oakland Hills, *Greene*, April, 1890.

2. **Cicuta douglasii** (DC.) C. & R.

?Sium? douglasii DC. Prodr. **4**: 125. 1830.
Cicuta crassifolia Nutt. in Rep. Wilkes' Exped. **17**: 316. 1874.
Cicuta purpurata Greene, Pittonia **2**: 8. 1889.

Stout, erect, 9 to 12 dm. high, with glaucous stem; the short rootstock giving rise to numerous slender fibrous roots above and thick elongated ones below; leaves twice pinnate, rather narrow in outline; leaflets thickish, lanceolate to ovate-lanceolate, 5 to 10 cm. long, sessile or nearly so, closely and sharply serrate to incised, the teeth often somewhat falcate, strongly reticulate beneath; fruit orbicular, 2 mm. long, the very broad and low ribs approximately equal in surface display (the laterals very much the largest in section), leaving very narrow intervals and small oil tubes.

Type locality, "in America boreali occid.;" collected by *Douglas;* type in Herb. London Hort. Soc., duplicate in U. S. Nat. Herb.

In marshes, from Oregon to Alaska.

Specimens examined:

OREGON: Swamps near Dairy, Klamath County, *Applegate*, August 11, 1895.

WASHINGTON: "In marshes at the confluence of the Columbia," *Douglas* (type); along Straits of De Fuca, *Scouler; Cooper;* Yakima River, *Greene*, August 14, 1889 (type of *C. purpurata*); *Henderson*, July–August, 1892.

BRITISH COLUMBIA: "Kooskooskee River," *Wilkes' Expcd.* 560.

ALASKA: Karluk River, *Bean*, in 1889; Khantaak Island, *Funston* 71, July 22, 1892.

3. **Cicuta vagans** Greene, Pittonia **2**: 9. 1889.

Stout, 6 to 15 dm. high, the branches often diffuse or reclining and spreading over a considerable area; rootstocks often very large and fleshy-thickened, horizontal or erect, aerial or nearly so, giving rise to few slender fibrous roots and numerous thick elongated ones, but rootstocks sometimes not at all thickened; leaves twice to thrice pinnate, rather broad in outline; leaflets rather thin, linear-lanceolate to lanceolate, 3 to 7.5 cm. long, sessile or nearly so, usually cuneate at base, more remotely and less sharply serrate than in *C. douglasii*, the teeth not at all falcate, and the lower surface not strongly reticulate; fruit orbicular, 2 to 3 mm. long, the ribs and oil tubes as in *C. douglasii*.

Type locality, "in an estuary of Lake Pend Oreille, Idaho;" collected by *Greene*, August 9, 1889; type in Herb. Greene, duplicate in U. S. Nat. Herb.

In wet places and marshes, from northeastern California to Idaho, British Columbia, and Vancouver Island.

Specimens examined:

CALIFORNIA: Wet places, Truckee, Nevada County, *Sonne* 6, August, 1892.

OREGON: Near Fort Klamath, altitude 1,470 meters, *Leiberg* 700, August 11, 1894.

WASHINGTON: Wet or boggy meadows, Falcon Valley, *Suksdorf*, July–September, 1883; Kitsap County, *Piper* 640, August 3, 1889; Samish Lake, Whatcom County, *Suksdorf* 1192, July 16, 1890; near Sumas, Whatcom County, and Olympia, Thurston County, *Henderson* 373, July–August, 1892; near Corby, *Grant*, February, 1896 (rootstocks); open swamp, upper valley of the Nesqually, *Allen* 255, July 14–September 17, 1896; Waitsburg, Walla Walla County, *Horner* 620, September 11, 1897; near Montesano, Chehalis County, *A. A. & E. Gertrude Heller* 4069, July 20, 1898.

IDAHO: Lake Pend Oreille, *Greene*, August 9, 1889 (type); valley of Lake Tesemini, Kootenai County, *Sandberg* 686, July 21, 1892; near Ketchum, Alturas County, *Henderson* 3402, July 23, 1895; wet soil, valley of North Fork of Cœur d'Alene River, altitude 930 meters, *Leiberg* 535, August 14, 1895.

BRITISH COLUMBIA: Long Lake, Vancouver Island, *Macoun*, August 23, 1889; near Westminster, *Macoun* 292, August 28, 1893.

This species is very apt to be confused with *C. douglasii*, but differs in its general habit, its foliage, and usually in its much enlarged and more or less aerial rootstocks.

4. **Cicuta bolanderi** Watson, Proc. Am. Acad. **11**: 139. 1876.

Stout, erect, 12 to 27 dm. high; rootstock short and thickish, giving rise below to numerous somewhat thickened elongated roots; leaves twice to thrice pinnate; leaflets linear-lanceolate and acuminate, 2 to 4 cm. long, closely and sharply serrate (teeth with spinulose tips),

lower leaflets petiolate and often deeply lobed; fruit orbicular, 2 mm. long, the narrow ribs approximately equal (in section as well as in surface display), leaving broad intervals and large oil tubes, which are sunk in the channeled seed.

Type locality, "at Suisun, California, in salt marshes;" collected by *Bolander;* type in Herb. Gray.

Known only from type locality.

Specimens examined:

CALIFORNIA: In Suisun Marsh, *Greene*, September 29, 1889.

In describing the habitat of this very local species Professor Greene says (Pittonia 2:7. 1889): "Very plentiful about Teal Station in the midst of the Suisun Marsh, and also near Martinez on the opposite side of Suisun Bay, growing among tall reeds and sedges in a hard but coarse and loose sod, the roots and base of the stem laved daily by the brackish tide water."

5. **Cicuta curtissii** C. & R., sp. nov.

Resembling *C. maculata* and heretofore confused with it, but differs as follows: rootstock much thicker; leaflets thickish, conspicuously reticulate beneath; fruit orbicular, 2 mm. long, constricted at the commissure; ribs approximately equal in surface display; the laterals largest in section, but not wedge-shaped or closely contiguous; dorsal and intermediate ribs about as broad as the intervals; oil tubes large.

Type locality, banks of streams, Duval County, Fla.; collected by *Curtiss*, no. 1030; type in U. S. Nat. Herb.

From southern Virginia and southeastern Kentucky to Florida and Louisiana.

Specimens examined:

VIRGINIA: Near Franklin, Southampton County, *Heller* 1165, July 22–29, 1893.

KENTUCKY: Near Poor Fork, Harlan County, *Kearney* 186, August, 1893.

NORTH CAROLINA: Near Linville, Mitchell County, *Kelsey*, September 15, 1890; swampy places near Biltmore, *Biltmore Herb.* 1965*a*, July 28, 1897.

GEORGIA: On banks of Yellow River, Gwinnett County, *Small*, July 20, 1893.

FLORIDA: Type specimen as cited under type locality; near Jacksonville, *Curtiss* 4917, June–August, 1894; near Eustis, Lake County, *Nash* 1025, June 16–30, 1894.

ALABAMA: Deep swamps near Mobile, *Mohr*, August 3, 1892; Sylacauga, Talladega County, *Pollard & Maxon* 218, July 19, 1900.

MISSISSIPPI: Near Madison, *Phares*, in 1883.

LOUISIANA: Near Covington, *Drummond*, in 1832.

6. **Cicuta maculata** L. Sp. Pl. 1: 256. 1753. FIG. 24.

C. virosa maculata C. & R. Rev. N. Am. Umbell. 130. 1888.

Stout, erect, branching, 9 to 18 dm. high; rootstock short, giving rise to slender fibrous roots above, and a fascicle of thick and usually short roots below; leaves large and broad, twice to thrice pinnate; leaflets rather thin, from narrowly lanceolate to oblong-lanceolate, 5 to 13 cm. long, coarsely and sharply serrate, midrib and primary veins distinct, but reticulation indistinct; fruit oblong, 4 mm. long, not constricted at the commissure; lateral ribs much the largest, wedge-

shaped in section and closely in contact with those of the other carpel, the two contiguous ones together forming a broad flat band; dorsal and intermediate ribs comparatively slender and leaving broad intervals; oil tubes large.

Type locality, "in Virginiæ aquosis;" collected by *Clayton*.

From New Brunswick to Virginia, west to South Dakota and Missouri.

Specimens examined:

NEW HAMPSHIRE: Low ground, near Jeffrey, *Deane*, July 16–27, 1890.

VERMONT: Burlington, *Grout*, August 9, 1893.

MASSACHUSETTS: Near Amherst, *Mrs. Alice Stevens*, August 1, 1895; near Winchendon, Worcester County, *Pollard*, September 3, 1895.

CONNECTICUT: Near Greens Farms, *Pollard* 155, July 7, 1894; near Stratford, *Eames*, August 16, 1894.

NEW YORK: Near Ithaca, *Coville*, July 11, 1885; same station, *Rowlee*, July 17, 1890; near Van Cortlandt, *Pollard*, May, 1893.

PENNSYLVANIA: Near Wrightsville, York County, *Small*, July 7, 1890.

NEW JERSEY: Near Clifton, Passaic County, *Nash*, July 25, 1891; near Stockholm, *Van Sickle*, August 10, 1895.

MARYLAND: Kings Creek, *Holmes*, July 24, 1890; near Bladensburg, *Pollard*, August 4, 1895.

DISTRICT OF COLUMBIA: Near Washington, *Vasey*, in 1873; Zoological Park, *Pollard* 508, July 26, 1895.

VIRGINIA: Along Peak Creek, Pulaski County, altitude 660 meters, *Small*, July 16, 1892; near Belfield, Greenville County, *Heller* 1002, June 19, 1893.

OHIO: Near Painesville, *Werner*, August 7, 1886; near Niles, *Ingraham*, July, 1891; near Oberlin, *Ricksecker*, June, 1895.

ONTARIO: Point Abino, *Pollard*, August 28, 1896.

INDIANA: Near Crawfordsville, *Rose*, June 23, 1892.

MICHIGAN: Near Owosso, *Hicks*, August 9, 1889; near Agricultural College, *Wheeler*, October 8, 1891.

ILLINOIS: River bank, Naperville, *Umbach*, July 23, 1897.

MISSOURI: Near Dodson, *Bush* 390, September 26, 1897.

WISCONSIN: Camp Douglas, *Mearns* 398, July 12, 1890.

MINNESOTA: Fort Snelling, *Mearns*, June 25, 1891.

SOUTH DAKOTA: Near Agricultural College.

NEBRASKA: Niobrara, *Clements* 2950, July 14, 1893.

A group of western forms, on the plains from Minnesota to Texas, is perhaps to be referred here, but certain differences suggest the possibility of segregation. The leaves are thicker and strongly reticulated, as in *C. curtissii*, and two types of fruit are represented—one with very broad corky ribs and narrow intervals, the other with ribs and intervals as in true *C. maculata* but with fruit almost orbicular. Our material is insufficient for any more definite reference, and the problem is commended to the botanists of the region.

These uncertain specimens are as follows:

MINNESOTA: Near Winona, *Holzinger*, September 14, 1889; Fort Snelling, *Mearns*, August 21, 1891.

IOWA: Near Ames, *Ball* 234, July 18, 1896.

KANSAS: Near Onaga, *Crevecœur* 24, in 1892.

OKLAHOMA: Stillwater, *Waugh* 32, September 5, 1893.

INDIAN TERRITORY: *Palmer* 150, in 1868.

ARKANSAS: Near Fort Smith, *Bigelow*, in 1853–54.

TEXAS: *Lindheimer* 615, in 1847; *Wright*, in 1851.

Cicuta maculata angustifolia Hook. Fl. Bor. Am. 1: 259. 1834.

Type locality, "on the Saskatchawan."

We have seen no authentically named specimens of this variety. It is perhaps not a variety of *C. maculata*, but should remain here until properly disposed of. To this variety perhaps should be referred the *Cicuta* with very narrow leaves collected in 1869 by Williams on the Yukon.

7. **Cicuta occidentalis** Greene, Pittonia **2**: 7. 1889.

Stout, 9 to 18 dm. high; rootstock short, giving rise to slender roots above, and a fascicle of thick and elongated ones below; leaves twice pinnate; leaflets from linear-lanceolate to lanceolate, 5 to 8 cm. long, sharply serrate and conspicuously reticulate beneath; fruit oblong, 3 mm. long, constricted at the commissure, the ribs approximately equal in surface display (laterals largest in section), the intervals broad; oil tubes large.

Type locality, Trinidad, Colo., "near the New Mexican line;" collected by *Greene*, July 17, 1889; type in Herb. Greene, duplicate in U. S. Nat. Herb.

In the Rocky Mountain region, from the Black Hills of South Dakota to Idaho, and southward through Colorado and northern Nevada to New Mexico.

Specimens examined:

South Dakota: Piedmont and Little Elk Creek, Black Hills, altitude 1,200 meters, *Rydberg* 723, June 28, 1892; near Forest City, *Griffiths & Schlosser*, September 3, 1892.

Nebraska: On Middle Loup River, near Mullen, Hooker County, Sand Hills region, *Rydberg* 1491, July 26, 1893.

Wyoming: Banks of Snake River, *Forwood*, August 15, 1881; Meadow Creek, *Nelson* 790, August 9, 1894; Ione Ranch, *Nelson* 1557, August 10, 1895; Upper Madison Canyon, Yellowstone Park, *Rydberg* 4611, August 3, 1897; Snake River, Yellowstone Park, *A. & E. Nelson* 6565, August 20, 1899.

Montana: Columbia Falls, *Williams* 375, September 12, 1892.

Idaho: Blackfoot, *Palmer* 298, July 8, 1893.

Nevada: Spring Valley, altitude 1,800 meters, *Watson* 441, September, 1868.

Utah: Near Salt Lake City, altitude 1,290 meters, *Jones* 1909, August 18, 1880; Springville, altitude 1,350 meters, *Jones* 5615, August 11, 1894.

Colorado: Trinidad, *Tracy* 38, June 8, 1887; same station, *Greene*, July 17, 1889 (type); Bear Creek, near Morrison, *Greene*, July 28, 1889; college grounds, State Agricultural College, *Buffum* 286, August 5, 1890; Hotchkiss, Delta County, altitude 1,650 meters, *Cowen*, June 23, 1892; Fort Collins, altitude 1,500 meters, *Cowen*, July, 1893 and 1895.

New Mexico: Las Vegas, *G. R. Vasey*, July 1881; Santa Fe, altitude 2,160 meters, *A. A. & E. Gertrude Heller* 3814, July 5, 1897; in the White Mountains, Lincoln County, altitude 1,890 meters, *Wooton* 233, July 28, 1897.

As defined above, *C. occidentalis* presents consistent characters and geographical distribution. Certain outlying forms, however, if referred here, would considerably extend the range and modify the specific limitations. Our material is insufficient to justify us in segregating these forms, but we present them as follows:

(1) A Californian form, called *forma frondosa* by Professor Greene, and often confused with *C. bolanderi*, has leaflets which are much larger (becoming 10 cm. long) and more coarsely toothed.

CALIFORNIA: Fort Tejon, *Xantus de Vesey* 36, in 1857–58; Mohawk Valley, *Lemmon*, May, 1878; San Luis Obispo, *Lemmon*, June, 1886; Mohawk Valley, *Lemmon*, May 28, 1889; Tehachapi, *Greene*, June 24, 1889; swampy flats, Los Angeles County, *Hasse*, July-September, 1890 and 1891.

OREGON: *Cusick* 2057, in 1898.

(2) An Oregon-Idaho form, with broader and thinner leaflets.

OREGON: Lower Wallowa Valley, *Cusick* 2256, July 26–August 10, 1899.

IDAHO: Near Granite Station, Kootenai County, *Leiberg* 636, June–August, 1892.

(3) An Arizona form, with broader and thinner leaflets, and fruit with broader ribs and narrower intervals.

ARIZONA: Oak Creek, *Rusby*, August 3, 1883; same station, *Lemmon*, August, 1884; Bakers Butte, *Toumey* 189, July 19, 1892.

(4) A Wyoming form, with orbicular fruit, but geographically distant from the orbicular-fruited species, and associated geographically with *C. occidentalis*.

WYOMING: Near Fort Russell, *Havard*, in 1893.

8. **Cicuta bulbifera** L. Sp. Pl. 1: 255. 1753.

Rather slender, 3 to 9 dm. high; leaves twice or thrice pinnate (sometimes appearing ternate); leaflets linear, sparsely toothed, 2.5 to 5 cm. long; upper axils bearing clustered bulblets; fruit (very rarely matured) orbicular, 2 mm. long, constricted at the commissure; ribs broad and low, approximately equal in surface display, intervals narrow.

Type locality, "Virginia, Canada;" collected by *Clayton*.

From Nova Scotia to Maryland, westward to Nebraska and Montana.

Specimens examined:

ONTARIO: Thousand Islands of the St. Lawrence, *Ward*, August 10, 1879; Ottawa, *Macoun*, August 10, 1894; Kingston, *Fowler*, August 27, 1895; Point Abino, *Pollard*, August 28, 1896.

MAINE: Dead River, *Fernald & Strong* 446, August 13, 1896.

VERMONT: Peacham, *Blanchard*, August 22, 1884.

MASSACHUSETTS: Essex County, *Oakes;* Concord River, Ashland, *Woolson*, August, 1872; Swampscott, *Summers*, August 10, 1887.

CONNECTICUT: Milford, *Eames*, August 28, 1895.

NEW JERSEY: Near Clinton, Passaic County, *Nash*, September 25, 1892; Stockholm, *Van Sickle*, August 10, 1895.

MARYLAND: Locust Point, Baltimore, *Katharine Taylor*, September 11, 1891.

NEW YORK: Near Ithaca, *Pearce*, September 27, 1884; *Cornell Univ. Coll.*, September 20, 1886.

PENNSYLVANIA: Lancaster County, *Porter*, September 4, 1863; Long Pond, Luzerne County, *A. A. & E. Gertrude Heller* 551, September 16–17, 1892.

OHIO: Near Niles, *Ingraham*, August, 1891.

INDIANA: Clarke, Lake County, *Umbach*, September 12, 1896.

MICHIGAN: Grayling, *Hicks*, August 17, 1889; near Agricultural College, *Wheeler*, August 30, 1890.

MINNESOTA: Winona, *Holzinger*, September 15, 1888; Fort Snelling, *Mearns*, August 27, 1891; Marine Mills, Washington County, *Taylor*, August, 1892.

NEBRASKA: On Middle Loup River, near Thedford, Thomas County, Sand Hills region, *Rydberg* 1737, September 7, 1893.

MONTANA: MacDonald Lake, *Williams* 902, August 6, 1895.

IDAHO: Near Granite, Kootenai County, *Leiberg*, June, 1892; same station, *Sandberg* 789, July 29, 1892.

26. DERINGA Adans. Fam. Pl. **2**: 498. 1763.

Cryptotaenia DC. Coll. Mém. **5**:42. 1829.

Calyx teeth obsolete. Fruit flattened laterally, linear-oblong, glabrous. Carpel with obtuse equal ribs, each subtended by a very broad group of strengthening cells (2 groups also on the commissural side). Stylopodium slender conical. Oil-tubes solitary beneath each rib (as well as in the intervals), 2 to 4 on the commissural side. Seed face plane or nearly so.

Glabrous perennials, with thin trifoliolate leaves, no involucre, involucels of minute bractlets or none, and white flowers.

Type species, *Sison canadense* L. Sp. Pl. **1**: 252. 1753.

A genus of 3 or 4 species, one of which is North American.

1. **Deringa canadensis** (L.) Kuntze, Rev. Gen. Pl. **1**: 266. 1891. FIG. 25.

Sison canadense L. Sp. Pl. **1**:252. 1753.
Cryptotaenia canadensis DC. Prodr. **4**: 119. 1830.

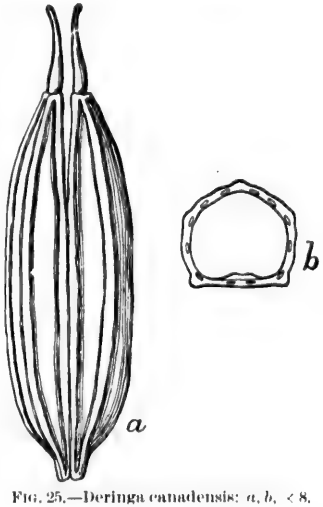

FIG. 25.—Deringa canadensis: *a*, *b*, × 8.

Erect, rather slender, 3 to 9 dm. high, branching; leaflets large, ovate, 5 to 13 cm. long, acute or acuminate, doubly serrate, often lobed; lateral leaflets oblique at base, usually sessile or nearly so; terminal leaflet abruptly narrowed into a petiolule (usually winged); umbels irregular and unequally few-rayed; pedicels very unequal, from 2 to 30 mm. long; fruit 4 to 6 mm. long, often becoming curved.

Type locality, "in America septentrionali."

From New Brunswick to Georgia, and west to South Dakota and Texas.

Specimens examined: Very few of the specimens of this common species are cited.

ONTARIO: Kingston, *Fowler*, September 3, 1883; Ottawa, *Macoun*, August 9, 1894.
VERMONT: Peacham, *Alice Stevens*, June 25, 1892; Manchester, *M. A. Day* 86, July 1, 1898.
MASSACHUSETTS: Great Barrington, *Pollard*, August 4, 1894; Hadley, *Alice Stevens*, July 20, 1895.
CONNECTICUT: Bridgeport, *Eames*, August 8, 1895.
NEW YORK: Oxford, *Coville*, June 21, 1883.
MARYLAND: Laurel, *Knowlton*, June 13, 1897.
DISTRICT OF COLUMBIA: Zoological Park, *Pollard* 529, July 26, 1895.
PENNSYLVANIA: Rawlinsville, in 1882.
OHIO: Lorain County, *Ricksecker*, July 9, 1894.
INDIANA: Near Indianapolis, *Coville*, August, 1892.
ILLINOIS: Near Chicago, *Babcock;* Naperville, *Umbach*, June 28, 1898.

MINNESOTA: Fort Snelling, *Mearns*, August, 1891 and 1896; Acton, Meeker County, *Frost*, June, 1892; Winona, *Holzinger*, June, 1890.
IOWA: Fayette County, *Fink*, June 5, 1894.
MISSOURI: Near St. Louis, *Drummond*, in 1832; Jackson County, *Bush* 341, June 14, 1896.
ARKANSAS: Fort Smith, *Bigelow*, in 1853–54.
KANSAS: Lawrence, *Stevens*.
NEBRASKA: Newcastle, *Clements*, June 21, 1893.
SOUTH DAKOTA: Brookings County, *Williams*, September 21, 1893.

27. **TAENIOPLEURUM** C. & R. Bot. Gaz. **14**: 283. 1889.

Calyx teeth prominent. Fruit flattened laterally, oblong, glabrous. Carpel with broad salient ribs, each tipped with a large group of strengthening cells. Stylopodium prominent and conical. Oil tubes very large, solitary in the intervals, 2 on the commissural side, and a small accessory one beneath each group of strengthening cells. Seed dorsally flattened, sulcate beneath the oil tubes, becoming loose in the pericarp and invested by a layer of secreting cells, the face plane or somewhat concave.

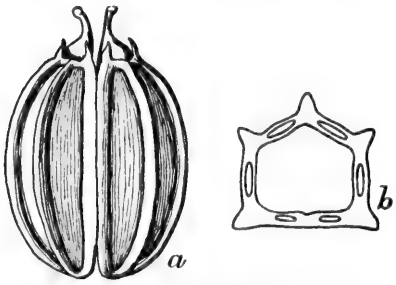

FIG. 26.—Taeniopleurum howellii: *a*, *b*, ×10.

Smooth erect herbs, from a fascicle of thickened fibers, with ternate-pinnate leaves, toothed (usually broad) leaflets, involucre and involucels of numerous conspicuous bracts, and white flowers.

A monotypic genus (based on *Carum howellii* C. & R.) belonging to Oregon and California.

1. **Taeniopleurum howellii** C. & R. Bot. Gaz. **14**: 284. 1889. FIG. 26.

Carum howellii C. & R. Rev. N. Am. Umbell. 129. 1888.
Ataenia howellii Greene, Pittonia **1**: 274. 1889.

Stem rather stout, 9 to 12 dm. high; leaves few, ternate then once or twice pinnate; leaflets lanceolate to ovate, strongly toothed or lobed; umbels many-rayed, with involucre of long narrowly oblanceolate bracts (becoming reflexed), and involucels of prominent lanceolate scarious-margined bractlets; rays 3 to 7 cm. long; pedicels 6 to 10 mm. long; fruit 3 to 4 mm. long.

Type locality, wet places, "Grant's Pass," Josephine County, Oreg.; collected by *Howell*, no. 710, July 13, 1887; type in Herb. Coulter, duplicate in U. S. Nat. Herb.

From southern Oregon to Mendocino and Mariposa counties, Cal.

Specimens examined:

OREGON: Type specimens, as cited under type locality.
CALIFORNIA: Near Mariposa, Mariposa County, *Congdon*, September–October, 1892; Round Valley, Mendocino County, *Chesnut*, June, 1898.

28. CARUM L. Sp. Pl. 1: 263. 1753.

Calyx teeth prominent for the size of the fruit. Fruit flattened laterally, orbicular to oblong, glabrous. Carpel with filiform or inconspicuous ribs, with or without strengthening cells. Stylopodium conical. Oil tubes large and solitary in the intervals, 2 to 6 on the commissural side. Seed dorsally flattened, more or less sulcate beneath the oil tubes; the face plane or slightly concave.

Smooth erect slender herbs, with tuberous or fusiform fascicled roots, pinnate leaves with few linear leaflets (in our native species), involucels of few to many bracts, and white flowers.

Type species, *Carum carui* L.

A genus of 22 species, belonging to the northern hemisphere, 4 species being found in western North America.

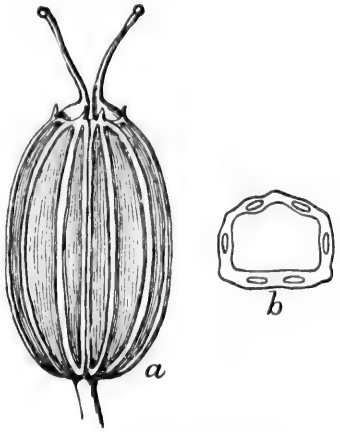

FIG. 27.—Carum oreganum: *a*, × 8; *b*, × 10.

Stylopodium very large, with short stout styles ..... 1. *C. kelloggii.*
Stylopodium low, with long slender styles.
  Fruit orbicular and small (2 mm.) ..... 2. *C. gairdneri.*
  Fruit oblong and larger (3 to 4 mm.).
    Fruit rounded at both ends, with inconspicuous ribs ..... 3. *C. oreganum.*
    Fruit narrowed at both ends, with conspicuous ribs ..... 4. *C. lemmoni.*

1. **Carum kelloggii** Gray, Proc. Am. Acad. 7: 344. 1867.

Ptaenia kelloggii Greene, Pittonia 1: 274. 1889.

Resembling *C. gairdneri*, but somewhat stout, from a fascicle of thickened fibers, with lower leaves ternate or biternate with pinnate divisions and linear segments; involucre and involucels more prominent and rather scarious; fruit larger, oblong, 3 to 5 mm. long, with small ovate calyx teeth, very prominent stylopodium, stout styles about the same length, and inconspicuous ribs; seed sulcate beneath the large oil tubes.

Type locality, "San Jose," Cal.; collected by *Brewer*, no. 832; type in Herb. Gray. This is the first specimen cited, and associated with it are "Oakland," *Bolander*, and "Bolinas," *Kellogg*.

Central California.

Specimens examined:

CALIFORNIA: Near San Francisco, *Wilkes Exped.* 1416; San Antonio Creek, *Kellogg & Harford* 308, August 14, 1868; Hamilton Station, Tuolumne County, *Lemmon* 72, August 11, 1889; Oakland Hills, *Lemmon* 75, August, 1889; Ocean View, San Francisco, *Alice Eastwood*, September 2, 1894; Amador County, altitude 450 meters, *Hansen* 72, August 10, 1896.

2. **Carum gairdneri** (Hook. & Arn.) Gray. Proc. Am. Acad. 7: 344. 1867.

Atenia gairdneri Hook. & Arn. Bot. Beechey, 349. 1840.
Edosmia gairdneri Nutt. in Torr. & Gray, Fl. 1: 612. 1840.

Stem 3 to 12 dm. high, from fascicled tuberous or fusiform roots; leaves few, usually simply pinnate, with 3 to 7 linear (sometimes almost filiform) leaflets 5 to 15 cm. long (the lower rarely pinnate); upper leaves usually simple; umbels 6 to 15-rayed, with involucre of several bracts or none, and involucels of linear acuminate bractlets; rays 2.5 to 4 cm. long; fruit broadly ovate or nearly orbicular, small, 1 to 2 mm. long, with small ovate calyx teeth, low conical stylopodium, and long slender styles; seed terete.

Type locality, near San Francisco or Monterey, Cal.; collected by *Douglas*.

From British Columbia to southern California, eastward to Black Hills of South Dakota, Colorado, and Arizona.

Specimens examined:

NORTHWEST TERRITORY: Medicine Hat, *Macoun*, August 19, 1880.

ALBERTA: St. Marys River, *Macoun* 10657, July 24, 1895.

VANCOUVER ISLAND: Somas River, *Macoun*, August, 1887 and 1889.

WASHINGTON: Klickitat County, *Suksdorf*, August 22, 1881; *G. R. Vasey* 307, August, 1889; Mason County, *Piper* 1051, July 23, 1890; Yakima County, *Henderson* 2521, June 17, 1892; *Sandberg & Leiberg* 414, in 1893; Almota, *Piper* 1935, July 24, 1894; Wenatchee, *Whited*, July–August, 1896; Whitman County, *Elmer* 71, July 30, 1896; Blue Mountains, Wallawalla County, *Horner* 5, August 19, 1896.

OREGON: Near Oregon City, *Kellogg & Harford* 307, July 26, 1869; Josephine County, *Lemmon* 80, October 23, 1889; Harney County, altitude 1,400 meters, *Coville & Leiberg* 17, July 24, 1896; *Sheldon* 8202, in 1897; banks of streams, *Cusick* 2067, August–September, 1898.

CALIFORNIA: Fort Tejon, *Xantus de Vesey* 38, in 1857–58; Sonoma Valley, *Torrey* 166, in 1865; Soda Springs, Nevada County, altitude 2,100 meters, *Jones* 2527, July 26, 1881; Howell Mountain, *Brandegee*, September, 1888; Los Angeles County, *Hasse*, August 26, 1890, and July, 1891; Amador County, *Hansen* 1842, July 13, 1896; southeastern California, altitude 1,200 to 1,500 meters, *Purpus* 5632, April–September, 1897.

ARIZONA: *Palmer*, in 1869; Bill Williams Mountain, altitude 2,100 meters, *MacDougal* 322, July 22, 1898.

UTAH: City Creek Canyon, altitude 2,190 meters, *Jones* 1916, August 20, 1880.

IDAHO: Lake Pend Oreille, Kootenai County, *Sandberg* 823, August 4, 1892; Moscow, *Henderson*, August–September, 1894; Lost River Mountains, altitude 2,490 meters, *Henderson* 4064, August 14, 1895; Nez Perces County, altitude 1,050 meters, *A. A. & E. Gertrude Heller* 3422, July 14, 1896.

MONTANA: Sandcoulee, *Williams* 198, August 13, 1891; near Red Lodge, *Rose*, July 24, 1893; Forks of the Madison, *Rydberg* 4632, July 26, 1897.

WYOMING: Jacksons Lake and head of Clarks Fork, *Forwood*, August, 1881; Yellowstone Park, *Knowlton*, August 14, 1881; northwestern Wyoming, *Rose* 324, September 3, 1893; Green River, Fremont County, *Stevenson* 42, August 21, 1894; Yellowstone Park, *Rydberg* 4633, August 14, 1897; Nez Perces Creek, Yellowstone Park, *A. & E. Nelson* 6204, July 29, 1899.

SOUTH DAKOTA: Black Hills near Fort Meade, *Forwood* 148, August 19, 1887.

COLORADO: Bear River, *Alice Eastwood*, July, 1891; Steamboat Springs, *Crandall*, July 25, 1891; Routt County, altitude 1,800 meters, *Crandall* 23, July 14, 1894; Egeria Park, altitude 2,400 meters, *Bethel* 3615, August, 1895.

3. **Carum oreganum** Watson, Proc. Am. Acad. **20**: 368. 1885.

FIG. 27.

Bunia oregana Greene, Pittonia **1**: 274. 1889.

Closely resembling *C. gairdneri*, but with lower leaves more divided, and with shorter linear lobes; involucels of broader and more scarious bractlets; fruit oblong, larger, 3 to 4 mm. long; with sepals (sometimes smaller) and stylopodium as in *C. gairdneri*, but the slender styles longer; seed flattened dorsally, sulcate beneath the oil tubes, and slightly concave on the face, with central longitudinal ridge.

Type locality, "on Wappatoo Island, Oregon;" collected by *Nuttall;* type in Herb. Gray.

From northern California and Nevada to Vancouver Island and Northwest Territory.

Specimens examined:

CALIFORNIA: On Mount Shasta, Siskiyou County, altitude 1,500 to 2,700 meters, *Brown* 489, July 1–15, 1897.

OREGON: Wet prairies near Salem, *Hall* 203, in 1871; North Fork of Sprague River, altitude 1,460 meters, *Coville & Leiberg* 254, August 6, 1896.

4. **Carum lemmoni** C. & R. Bot. Gaz. **14**: 283. 1889.

Resembling *C. gairdneri*, but fruit oblong, tapering somewhat at base and apex, 3 mm. long and 2 mm. broad, and with conspicuous ribs, each of which contains a small group of strengthening cells; calyx teeth prominent and concealing the small stylopodium; styles long and slender.

Type locality, "Tuolumne forest," California; collected by *Lemmon*, August, 1889; type in U. S. Nat. Herb., duplicate in Herb. Coulter.

Tuolumne County, Cal., and perhaps extending northward to Josephine County, Oreg., and southward to Los Angeles County, Cal.

Specimens examined:

CALIFORNIA: Type specimens as cited under type locality.

Two other collections are tentatively referred here, but they are distinct in geographical range and somewhat in character, although subsequent collections may connect the three stations in a more general distribution. They are as follows:

Valley of Siskiyou Mountains, altitude 600 meters, Josephine County, Oreg., *Lemmon* 81, October 23, 1889. These specimens seem to be almost identical with those from Tuolumne County, Cal.

Brackish flats near Ballona, Los Angeles County, Cal., *Hasse*, September 20, 1890. In these specimens the fruit is less tapering, being more distinctly oblong, and the stylopodia are sometimes a little more prominent.

For introduced species, see page 253.

29. ALETES C. & R. Rev. N. Am. Umbell. 27 and 125. 1888.

Calyx teeth prominent. Fruit flattened laterally, oblong, glabrous. Carpel with equal and prominent ribs. Stylopodium wanting. Oil tubes large and solitary (several in *A. davidsoni*) in the broad intervals, 2 on the commissural side and a small one in each rib. Seed sulcate beneath the oil tubes, with face plane or slightly concave.

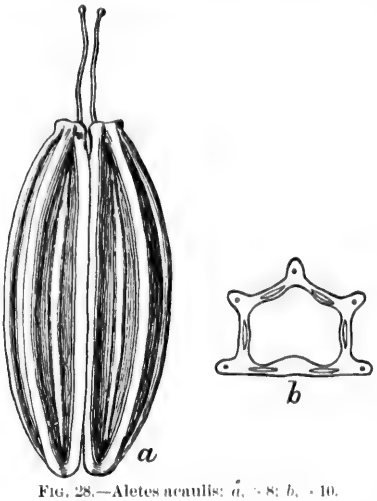

FIG. 28.—Aletes acaulis: *a*, ×8; *b*, ×10.

Acaulescent (except in *A. davidsoni*) glabrous mountain perennials, with pinnate (ternate at first in *A. davidsoni*) leaves, broad sharply toothed or cut rather distant leaflets (except in *A. tenuifolia*), mostly no involucre, involucels of linear to lanceolate bractlets, and yellow (purple in *A. davidsoni*) flowers.

Types species, *Deweya acaulis* Torr.

A genus of 4 or 5 species, belonging to the rocky foothills of Colorado, New Mexico, and Arizona.

Leaflets broad and sharply toothed.
  Flowers yellow.
    Ribs equally prominent and not winged; pedicels very short.
      Peduncles longer than the leaves ..... 1. *A. acaulis.*
      Peduncles much shorter than the leaves ..... 2. *A. humilis.*
    Lateral ribs (and sometimes dorsals) becoming winged; pedicels 2 to 3 mm. long. 3. *A.* (?) *macdougali.*
  Flowers deep purple ..... 4. *A.* (?) *davidsoni.*
Leaflets filiform to linear, entire ..... 5. *A.* (?) *tenuifolia.*

1. Aletes acaulis (Torr.) C. & R. Rev. N. Am. Umbell. 126. 1888. FIG. 28.

Deweya (?) *acaulis* Torr. Pacif. R. Rep. **4**[1]: 94. 1856.
Oreosciadium acaule Gray, Proc. Am. Acad. **7**: 343. 1867.
Seseli hallii Gray, l. c. **8**: 288. 1870.
Musenium greenei Gray, l. c. 387. 1872.
Carum (?) *hallii* Watson, Bibl. Index 416. 1878.
Zizia hallii C. & R. Bot. Gaz. **12**: 137. 1887.

Cespitose, with peduncles 10 to 30 cm. high, often much longer than the leaves; leaflets ovate, irregularly toothed and cut, sometimes almost pinnatifid; umbels 8 to 15-rayed; rays stiff, 10 to 20 mm. long; fruit almost sessile, narrowly oblong, 4 to 5 mm. long.

Type locality (*Deweya acaulis*), "in crevices of rocks near Santa Antonita, New Mexico;" collected by *Bigelow;* type in Herb. Columbia Univ.

Rocky foothills of Colorado and New Mexico.

Specimens examined:

COLORADO: Castle Rock, near Golden, altitude 1,800 meters, *Patterson* 37, July-September, 1885; near Morrison, *Alice Eastwood*, in 1891; near Golden, *Crandall*, April 30, 1892; Boulder County, *Marie Holzinger*, August, 1892; mountains near Morrison, altitude 1,800 meters, *Bethel*, May, 1895, and October, 1897; South Table Mountain, near Golden, *Knowlton* 76, June 17, 1896.

NEW MEXICO: Socorro, *G. R. Vasey*, May, 1881.

2. **Aletes humilis** C. & R., sp. nov.

Cespitose, with peduncles much shorter than the leaves, 2 to 5 cm. long; petioles slender, longer than the blade; leaflets generally 5, entire to few-toothed, slightly scabrous on the margin, linear to obovate; rays 4 to 6, rather weak and spreading, 2.5 to 3 cm. long; pedicels very short; involucels of linear distinct bractlets; fruit ovate, 3 mm. long.

Type locality, Dale Creek, Larimer County, Colorado; collected by *George E. Osterhout*, no. 6, July 19, 1899; type in U. S. Nat. Herb.

Only known from type locality.

Mr. Osterhout also recognized this plant as a new species, but has kindly permitted us to publish it.

3. **Aletes (?) macdougali** C. & R., sp. nov.

With much the habit and foliage of *A. acaulis;* leaves narrow in outline, pinnate; leaflets few, ovate, few-toothed; peduncles longer than the leaves, 1 to 1.5 dm. high; rays 4 to 6, 5 to 10 mm. long; pedicels 2 to 3 mm. long; involucels of few linear distinct bractlets; flowers yellow; fruit (at least at first flattened laterally) narrowly oblong, 4 mm. long, the lateral ribs (and sometimes the others) becoming winged; seed nearly terete in cross section; oil tubes solitary in the intervals.

Type locality, on Berry's trail to the Grand Canyon of the Colorado, Arizona; collected by *D. T. MacDougal*, no. 192, June 28, 1898; type in U. S. Nat. Herb.

Only known from type locality.

This species differs from the other two in having the ribs sometimes (perhaps always) winged. The material, however, is too scanty to be positive as to it generic position.

4. **Aletes (?) davidsoni** C. & R., sp. nov.

Stems (and leaves) numerous, crowning more or less thickened elongated roots; short caulescent, 1 to 3 dm. high, much branched, glabrous; leaves ternate, the central lobe again ternate, all then pinnate; leaflets ovate in outline, 2 or 3-cleft into linear acute lobes, or the lower ones again cleft, while the upper ones sometimes become entire; peduncles 5 to 8 cm. long, glabrous except some puberulence at the top; rays few (6 to 10), nearly equal; pedicels 2 to 3 mm. long;

involucre none; involucel of several linear sometimes elongated bractlets; flowers deep purple; fruit oblong, 3 mm. long, flattened laterally, crowned by prominent calyx teeth; carpels more or less flattened dorsally, the lateral and sometimes the dorsal and intermediate ribs more or less winged; stylopodium none; oil tubes several in the intervals; seed face plane.

Type locality, near Coronado mine, Clifton, Ariz., among rocks in moist creek; collected by *A. Davidson*, no. 161, June 7, 1900; type in U. S. Nat. Herb.

Arizona.

Specimens examined:

ARIZONA: Type specimens as cited under type locality.

Flowering material of this species was sent by Mr. S. B. Parish in the winter of 1899–1900, but we were unable to determine it. Dr. A. Davidson, however, kindly consented to re-collect the species in fruiting condition. He has just sent in specimens, which enable us to characterize the species. We are unable, however, to decide with definiteness its generic relations. In habit it suggests *Pseudocymopterus montanus*, but the fruit is quite different. From typical *Aletes* it likewise seems different, but for the present there seems to be no better place for it.

5. **Aletes (?) tenuifolia** C. & R., sp. nov.

Stems glabrous, once to twice branching, slender and weak, usually longer than the leaves, 1 to 2 dm. long; leaves delicate, pinnate; leaflets 3 to 5, entire, filiform to linear, acute, 1 to 3 cm. long; rays very short (2 to 4 mm. long); fruit subsessile (the pedicels 1 mm. or less long); involucre wanting; involucels linear, entire, 3 to 6 mm. long; fruit oblong, 3 to 4 mm. long, slightly roughened; seed flattened slightly dorsally; carpels rather strongly 5-ribbed; oil tubes 2 or 3 in the intervals.

Type locality, near Logan, Utah; collected by *P. A. Rydberg*, August 9, 1895; type in New York Botanical Garden herbarium, fragments and photograph in U. S. National Herbarium.

Specimens examined: Type specimens as cited under type locality.

We are at loss just where to refer this species, and it is placed here only tentatively.

30. LEIBERGIA C. & R. Contr. Nat. Herb. **3**: 575. 1896.

Calyx teeth obsolete. Fruit flattened laterally, linear, beaked, glabrous. Carpels only slightly flattened dorsally, with five filiform ribs, the two laterals a little more prominent and turned inward. Stylopodium wanting. Oil tubes small, single in the intervals, two on the commissural side. Seed face broad, slightly concave, but when dry becoming more or less involute.

Slender glabrous acaulescent plants from small globose tubers, with leaves ternately divided into long filiform leaflets, irregular umbels, subsessile fruit, and white flowers.

A monotypic genus of the Columbia River region.

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LEIBERGIA OROGENIOIDES C. & R.

1. **Leibergia orogenioides** C. & R. Contr. Nat. Herb. **3**: 575. pl. 27. 1896.
PLATE III.

Slender, 1.2 to 5 dm. high; leaves nearly as long as the flowering peduncle; leaflets 1 to 7.5 cm. long, entire or with few teeth or linear lobes; rays of the umbel 3 to 10, very slender, often spreading, very unequal, 2 to 12 cm. long; umbellets with few flowers and fruits; pedicels 2 mm. or less long; involucre wanting; involucels of 3 or 4 small bractlets somewhat united at base; fruit 8 mm. long, flattened laterally but terete at base, terete and somewhat beaked at apex.

Type locality, "Santianne Creek bottoms, Cœur d'Alene Mountains, Idaho, altitude 950 meters;" collected by *Leiberg*, no. 1027, June 24, 1895; type in U. S. Nat. Herb.

Wet ground, along streams, Idaho and Washington.

Specimens examined:

IDAHO: Type specimens, as cited under type locality.

WASHINGTON: Low, damp ground along streams, Spokane River, *Suksdorf* 1211, May 13, 1889.

EXPLANATION OF PLATE III.—Fig. *1*, plant; *2*, umbel; *3* and *4*, fruit; *5*, cross section of carpel.

We quote Mr. Leiberg's description of the plant in its habitat, as follows: "The plant, in the region where I collected it, occupies the same place in the flora of the heavily forested region of the lower white pine zone as do the tuberous-rooted, early flowering species of *Peucedanum* on the open plains of the Columbia, in Oregon, Washington, and Idaho; that is to say, it is an early flowering species, coming into bloom very soon after the snow leaves, preferring basaltic formations or soils derived from basaltic rocks. Wherever it grows it appears in such abundance that at the time of flowering it quite hides all other species."

31. **TAENIDIA** Drude in Engler & Prantl, Nat. Pflanzfam. **3**^{8}: 195. 1898.

Calyx teeth obsolete. Fruit flattened laterally, broadly oblong, glabrous. Carpel with equal filiform ribs. Stylopodium wanting. Oil tubes mostly 3 in the intervals, 4 on the commissural side. Seed nearly terete in section, with plane face.

Glabrous and glaucous perennials, with ternately compound leaves, usually no involucre or involucels, and yellow flowers.

A monotypic genus (based on *Smyrnium integerrimum* L.) of the Eastern United States and Canada.

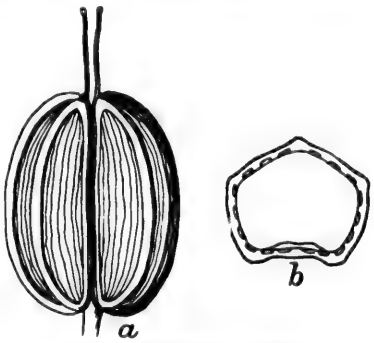


FIG. 29.—Taenidia integerrima: *a*, ×8; *b*, ×10.

1. **Taenidia integerrima** (L.) Drude, l. c. FIG. 29.

Smyrnium integerrimum L. Sp. Pl. **1**: 263. 1753.
Zizia integerrima DC. Mém. Soc. Phys. Genèv. **4**: 493. 1828.
Pimpinella integerrima Gray, Proc. Am. Acad. **7**: 345. 1868.

Glaucous, 3 to 9 dm. high, branching; leaves 2 to 3-ternately compound; leaflets lanceolate to ovate, entire; umbels 10 to 20-rayed; rays 5 to 8 cm. long; pedicels 8 to 12 mm. long; fruit broadly oblong, 4 mm. long.

Type locality, "Virginia."

From Canada to North Carolina, west to Minnesota and Arkansas.

Specimens examined:

ONTARIO: Sturgeon Point, *Scott*, August 1, 1891; Kingston, *Fowler*, July 10, 1893.

NEW YORK: Ithaca, *Pearce* (May 28, 1883), *Coville* (May 22, 1884), *Wiegand* (June–July, 1893).

PENNSYLVANIA: Near Lancaster, *Small*, May 14, 1891.

NEW JERSEY: Plainfield, *Tweedy*, May, 1879; Sussex County, *Pollard*, May 19, 1894; Guttenberg, *Van Sickle*, May 20, 1895.

MARYLAND: Glen Echo, *Pollard* 198, May 12, 1895.

DISTRICT OF COLUMBIA: Rock Creek, *Powell*, August 1, 1877.

VIRGINIA: Salt Pond Mountain, *Canby*, August, 1890.

NORTH CAROLINA: Summit of Table Rock Mountain, *Small & Heller* 280, July 2, 1891; near Biltmore, *Biltmore Herb.* 4350*a*, June 1, 1896.

TENNESSEE: French Broad River, *Kearney* 700, August 25, 1897; Knox County, *Ruth* 426, June, 1898.

WEST VIRGINIA: Upshur County, *Pollock*, May, 1895 and 1897.

OHIO: Lancaster, *Bigelow;* Niles, *Ingraham*, July, 1891; Lorain County, *Ricksecker*, May 14, 1892.

INDIANA: Crawfordsville, *Rose*, June 22, 1892.

MICHIGAN: Alma, *Davis*, August 28, 1891.

ILLINOIS: Near Chicago, *Babcock;* Naperville, *Umbach*, July 16, 1897.

MISSOURI: Jackson County, *Bush* 868, May 17, 1896.

IOWA: Fayette County, *Fink*, June–August, 1894.

MINNESOTA: Winona, *Holzinger*, July, 1889.

32. **EULOPHUS** Nutt. in DC. Coll. Mém. **5**: 69. 1829.

Podosciadium Gray, Proc. Am. Acad. **7**: 345. 1868.

Calyx teeth prominent. Fruit flattened laterally, ovate to linear oblong, glabrous. Carpel with equal filiform ribs, and thin pericarp with a very small group of strengthening cells beneath each rib. Stylopodium conical, with long and recurved styles. Oil tubes 1 to 5 in the intervals, 4 to 8 on the commissural side, and a small group in the parenchyma of the commissural sulcus. Seed face broadly concave, with a central longitudinal ridge.

Glabrous perennials 3 to 15 dm. high, from deep-seated fascicled tubers, with pinnately or ternately compound leaves, narrowly linear to oblong-linear mostly entire leaflets (or segments), the terminal one elongated, involucre (rarely wanting) and involucels of several lanceolate acuminate usually subcarious bracts, and long-peduncled umbels of white or pinkish flowers.

Type species, *Eulophus americanus* Nutt.

A genus of 6 species, belonging to the United States.

Oil tubes several in the intervals.

Involucels of small setaceous bractlets.

Petioles and rachis not enlarged.
Fruit larger (4 to 6 mm.); Eastern ..... 1. *E. americanus*
Fruit smaller (3 to 4 mm.); Californian ..... 2. *E. parishii*.
Petiole and rachis broad and inflated.
Leaflets narrowly linear to filiform ..... 3. *E. pringlei*.
Leaflets linear-lanceolate ..... 4. *E. simplex*.
Involucels of large bractlets longer than the pedicels ..... 5. *E. bolanderi*.
Oil tubes solitary in the intervals ..... 6. *E. californicus*.

1. **Eulophus americanus** Nutt. in DC. Coll. Mém. **5**: 69. pl. 2. fig. m. 1829. FIG. 30.

Erect, 9 to 15 dm. high; basal and lower cauline leaves large, once or twice pinnately compound, with leaflets cut into short narrow segments; upper cauline leaves ternate, with narrowly linear elongated leaflets (2.5 to 5 cm. long, 3 mm. wide); umbel 10 to 12-rayed, with involucre scanty or none, and involucels of numerous linear bractlets (tapering from the bottom) 2 to 3 mm. long; fruit ovate or oblong, 4 to 6 mm. long, 3 to 4 mm. broad, with ribs almost obsolete; oil tubes mostly 3 in the intervals, 4 on the commissural side.

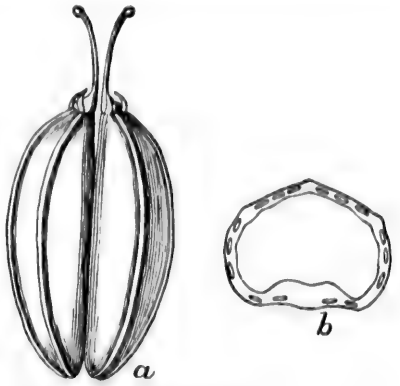


FIG. 30.—Eulophus americanus: *a*, ×8; *b*, ×10.

Type locality, "la territoire de l'Arkansa;" collected by *Nuttall*; type in Herb. DC., duplicate in Herb. Columbia Univ. and Herb. Philad. Acad.

Ohio to Missouri, south to Tennessee and Arkansas.

Specimens examined:

ILLINOIS: Near Athens, *Hall*, July, 1861; Riverside, near Chicago, *Babcock*, July 8, 1871; Naperville, *Umbach*, June 28, 1897.

MISSOURI: Jefferson County, *Hasse*, June, 1887; Shannon County, *Bush* 47, August 1889, and 1890; Washington County, *Martone*, July, 1893; Eagle Rock, *Bush* 76, 185, May–June, 1897 and 1898; Swan, *Bush* 213, June 8, 1898.

2. **Eulophus parishii** C. & R. Rev. N. Am. Umbell. 112. 1888.

Pimpinella parishii C. & R. Bot. Gaz. **12**: 157. 1887.

Slender, 2 to 9 dm. high; leaves ternate (rarely biternate), on petioles 5 to 13 cm. long (the whole leaf, including the petiole, sometimes becoming 3 dm. long), with narrowly linear (almost filiform) to narrowly lanceolate leaflets 2.5 to 7.5 cm. long, 1 to 10 mm. wide, terminal leaflet (sometimes 12.5 cm. long) more or less distant; uppermost leaves simple and bract-like; umbel 8 to 10-rayed, with scanty involucre or none, and involucels of 2 to 6 narrowly lanceolate bractlets 4 mm. long; rays 1 to 2.5 cm. long; pedicels 4 to 8 mm. long; fruit ovate or

oblong, 2 to 4 mm. long, 1 to 2 mm. broad; oil tubes 2 to 4 in the intervals, 6 on the commissural side.

Type locality, "damp meadows, Bear Valley, San Bernardino Mountains, California;" collected by *S. B. & W. F. Parish*, no. 987, August, 1882; type in Herb. Coulter, duplicate in U. S. Nat. Herb.

In southern California, from Fresno County southward.

Specimens examined:

CALIFORNIA: Near San Diego, *Palmer*, in 1875; Cuyamaca Mountains, San Diego County, *Orcutt* 10, July, 1889; type specimens as cited under type locality; Fresno County, *Coville & Funston* 1846, August 3, 1891; type locality, altitude 1,950 meters, *Parish* 3171, June 24, 1894; San Jacinto Mountains, altitude 2,400 meters, *Hall* 851, August 5, 1897.

Eulophus parishii rusbyi C. & R. Bot. Gaz. **14**: 281. 1889.

Leaflets filiform to linear, sometimes becoming 15 cm. long; fruit larger, about 4 mm. long and 3 mm. broad.

Type locality, "Bill Williams Mountain," Arizona; collected by *Rusby*, no. 629, July 11, 1883; type in U. S. Nat. Herb.

Mountains of northern Arizona.

Specimens examined:

ARIZONA: Type specimens as cited under type locality; Flagstaff, *Lemmon* 60, June, 1884.

3. **Eulophus pringlei** C. & R. Rev. N. Am. Umbell. 113. 1888.

Erect, 3 to 6 dm. high; leaves pinnately compound, with broad inflated midrib and distinct divisions, which are cut into a few narrowly linear almost filiform segments; umbel 3 to 8-rayed, with scanty involucre, and involucels of numerous subscarious lanceolate bractlets about a third as long as the pedicels (sometimes nearly as long); rays about 5 cm. long; pedicels 6 to 12 mm. long; fruit oblong, 4 to 5 mm. long, about 1 mm. broad; oil tubes 3 to 5 in the intervals, 8 on the commissural side.

Type locality, in "California;" collected by *Pringle*, no. 40, in 1882; type in Herb. Gray.

Southern California.

Specimens examined:

CALIFORNIA: San Luis Obispo, *Jones* 3230, May 6, 1882; Chalcedon Hill, San Luis Obispo County, *Mrs. R. W. Summers*, in 1889; Kern River Valley, Kern County, altitude 900 to 1,450 meters, *Coville & Funston* 1050, June 23, 1891; near Acton, San Bernardino Mountains, Los Angeles County, *Hasse*, May 21, 1893.

Eulophus simplex C. & R.

? Carum gairdneri latifolium Gray, Proc. Am. Acad. **7**: 344. 1867.
E. pringlei simplex C. & R. Rev. N. Am. Umbell. 113. 1888.

Stems nearly simple, erect, glabrous; basal leaves on elongated peduncles; leaflets 3, elongated linear to lanceolate, 7 to 12 cm. long; involucels of scarious lanceolate bractlets usually shorter than the

slender pedicels; fruit oblong (immature); stylopodium conical; style slender; calyx teeth prominent.

Type locality, "Sierra County, Cal.:" collected by *Lemmon* in 1874.

Specimens examined:

CALIFORNIA: Ebbets Pass, *Brewer* 2030, in 1863.

NEVADA: Near Carson City, in 1864.

Unfortunately we have not been able to locate the type of this species, and therefore we could not reexamine its characters. It seems hardly possible that it could be a variety of *E. pringlei*. It is very likely the same as *Carum gairdneri latifolium*, which is undoubtedly a *Eulophus*. The description above is drawn wholly from the type specimens of *Carum gairdneri latifolium*.

5. **Eulophus bolanderi** (Gray) C. & R. Rev. N. Am. Umbell. 112. 1888.

Podosciadium bolanderi Gray, Proc. Am. Acad. **7**: 346. 1868.

Erect, 6 dm. high; leaf divisions more or less pinnately compound; ultimate segments narrowly linear, 1 to 3 cm. long (terminal one sometimes 7.5 cm.), 0.5 to 2 mm. wide (lateral leaflets sometimes much reduced and toothed); uppermost leaves simple; umbel 10 to 25-rayed, with prominent involucre, and involucels of scarious ovate-lanceolate abruptly long-acuminate bractlets longer than the pedicels; rays 10 to 20 mm. long; pedicels 3 to 4 mm. long; fruit oblong, 3 mm. long, 1 mm. broad; oil tubes small, 2 to 5 in the intervals, 6 on the commissural side; seed more dorsally flattened than in any other species.

Type locality, "Mariposa Trail, Yosemite," California; collected by *Bolander;* type in Herb. Gray.

California and Oregon, eastward to Utah and Idaho.

Specimens examined:

CALIFORNIA: *Bolander*, in 1873; Sierra Valley, Sierra County, *Lemmon*, August, 1874 and 1875; Emigrant Gap, *Jones* 3603, June 28, 1882; in the region of Mount Whitney, altitude 2,100 to 2,400 meters, *Katharine Brandegee;* Colby, Butte County, *R. M. Austin* 256, July, 1896; Pah Ute Peak, southeastern California, altitude 1,200 to 1,500 meters, *Purpus* 5293, April–September, 1897.

OREGON: *Cusick* 1097, May, 1883; Steins Mountain, *Howell*, June 1, 1885; Malheur Butte, Malheur County, altitude 720 meters, *Leiberg* 2027, May 12, 1896; Otis Creek, Malheur County, altitude 1,100 meters, *Leiberg* 2335, June 20, 1896; near Harney, Blue Mountains, *Coville* 524, July 10, 1896; hillsides near Snake River, *Cusick* 1916, June 2, 1898.

IDAHO: *Wilcox*, in 1883; Long Valley, altitude 1,200 meters, *Henderson* 3181, July 6, 1895; Salubria, Cuddy Mountains, Indian Valley, and Payette Lake, *Jones*, July 10–25, 1899.

UTAH: East Humboldt Mountains, altitude 2,100 meters, *Watson* 442, July, 1869.

NEVADA: Geiger Grade, *Katharine Brandegee*, July, 1884; near Verde, Washoe County, *Somme*, June, 1890 and 1895.

6. **Eulophus californicus** (Torr.) C. & R. Rev. N. Am. Umbell. 114. 1888.

Chaerophyllum (?) *californicum* Torr. Pacif. R. Rep. **4**[1]: 93. 1856.

Podosciadium californicum Gray, Proc. Am. Acad. **7**: 346. 1868.

Erect, 9 to 12 dm. high; leaf divisions pinnately compound; segments linear, 1 to 2.5 cm. long, 2 to 3 mm. broad, terminal one elon-

gated (5 to 13 cm. long); uppermost leaves simple; umbel 9 to 12-rayed, with prominent involucre, and involucels of numerous scarious lanceolate long-acuminate bractlets 6 mm. long; rays 5 cm. long; pedicels 16 to 20 mm. long; fruit linear-oblong, 8 mm. long, 3 mm. broad; oil tubes large, solitary in the intervals, 4 on the commissural side; sulcus of seed face deeper than in other species, and with more prominent central ridge.

Type locality, "wet ravines, Knights Ferry, Stanislaus County," California; collected by *Bigelow*, May 8, 1854; type in Herb. Gray.

Central California.

Specimens examined:

CALIFORNIA: Mendocino County, *G. R. Vasey*, in 1875; Santa Lucia Mountains, *G. R. Vasey* 227, July, 1880; *Greene*.

33. SIUM L. Sp. Pl. 1: 251. 1753

Calyx teeth minute. Fruit flattened laterally, ovate to oblong, glabrous. Carpel with prominent corky nearly equal ribs, each with a prominent group of strengthening cells at tip. Stylopodium depressed; styles short. Oil tubes 1 to 3 in the intervals (never solitary in all the intervals), 2 to 6 on the commissural side. Seed subangular, with plane face.

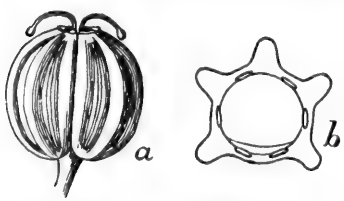


FIG. 31.—Sium cicutaefolium: *a*, *b*, ×12.

Smooth perennials growing in water or wet places, with pinnate leaves and serrate or pinnatifid leaflets, involucre and involucels of numerous narrow bracts, and white flowers.

First species cited, *Sium latifolium* L.

A genus of about 10 species, belonging to the north temperate regions of both hemispheres, and also in South Africa.

Stout and tall; leaflets narrow; fruit larger (3 mm. long) ..... 1. *S. cicutaefolium*.
Weak and lower; submerged or floating leaves broad; fruit smaller (2 mm. long). 2. *S. carsonii*.

1. Sium cicutaefolium Gmelin, Syst. **2**: 482. 1791. FIG. 31.

Sium lineare Michx. Fl. Bor. Am. **1**: 167. 1803.

Stout, 6 to 8 dm. high; leaflets 3 to 8 pairs, linear to lanceolate, sharply serrate and mostly acuminate, 5 to 13 cm. long (lower leaves sometimes submersed and finely dissected, as in the next); umbel many-rayed; rays 2.5 to 4 cm. long; pedicels 2 to 6 mm. long; fruit 3 mm. long, with prominent ribs; oil tubes 2 to 6 on the commissural side.

Type locality unknown to us.

In swamps from Newfoundland to Virginia, west to British Columbia and northern California. We have no specimens from the southern belt of the United States.

Specimens examined: We cite but few of the very numerous specimens of this common and widely distributed species.

NEWFOUNDLAND: Whitbourne, *Robinson & Schrenk* 212, October 15, 1894.
VERMONT: Barnet, *Blanchard*, August 25, 1884.
MASSACHUSETTS: West Quincy, *Deane*, June 28, 1890.
CONNECTICUT: Bridgeport, *Eames*, May 2, 1895.
NEW YORK: Ithaca, *Coville*, August 20, 1885.
PENNSYLVANIA: Harrisburg, *Small*, July 28, 1888.
DISTRICT OF COLUMBIA: Great Falls of the Potomac, *Pollard* 107, April 27, 1895.
VIRGINIA: Smyth County, *Small*, July 25, 1892.
OHIO: Lorain County, *Ricksecker*, August 10, 1894.
INDIANA: Lake County, *Umbach*, August 20, 1898.
MICHIGAN: Near Agricultural College, *Wheeler*, in 1892.
WISCONSIN: Camp Douglas, *Mearns*, August 3, 1891.
MISSOURI: Jackson County, *Bush* 252, August 22, 1896.
IOWA: Fayette County, *Fink* 419, August, 1894.
MINNESOTA: Fort Snelling, *Mearns*, September 1, 1891.
SOUTH DAKOTA: Brookings, *Thornber*, August 25, 1893.
NEBRASKA: Grant County, *Rydberg* 1615, July 3, 1893.
COLORADO: San Luis Valley, *Wolf* 730, September, 1873.
WYOMING: Yellowstone Park, *Rydberg* 4601, August 3, 1897; Laramie River, Albany County, *Nelson* 4281, September 15, 1897; Jacksons Lake, *A. & E. Nelson* 6551, August 18, 1899.
MONTANA: Great Falls, *Williams* 374, July 22, 1886; East Gallatin, *Flodman* 685, July 24, 1896.
IDAHO: Lake Pend Oreille, *Leiberg* 637, August, 1891; Mud Lake, Kootenai County, *Sandberg* 733, July 25, 1892.
UTAH: Ogden, *Tracy* 483, August 4, 1887; Marysvale, *Jones* 5974, September 1, 1894.
NEVADA: Ruby Valley, *Watson* 443, July, 1868.
CALIFORNIA: Siskiyou and Plumas counties, *Brown*, July–August, 1897.
OREGON: Crook County, *Leiberg* 828, August 27, 1894; Drews Valley, *Coville & Leiberg* 157, August 2, 1896.
WASHINGTON: Seattle, *Piper*, August, 1888.
BRITISH COLUMBIA: Near Westminster, *Macoun* 302, August 28, 1893; near Lake Shawnigan, Vancouver Island, *Canby* 94, August 16, 1897.
GREAT SLAVE LAKE: *Kennicott*, in 1861–62.

2. **Sium carsonii** Durand, in Gray's Man. ed. 5. 196. 1867.

Weak, 3 to 6 dm. high; leaflets 1 to 6 pairs, linear to lanceolate, sharply serrate, 2.5 to 5 cm. long; when submersed or floating very thin, ovate to oblong, usually laciniate-toothed or dissected, the leaf sometimes reduced to the terminal leaflet; umbel fewer (10 to 15)-rayed; rays about 2.5 cm. long; pedicels 2 to 6 mm. long; fruit smaller, about 2 mm. long, with less prominent ribs; oil tubes 2 to 4 on the commissural side.

Type locality, "Pennsylvania, around the Pocono Mountain."

In streams, Maine to Pennsylvania; also in Minnesota.

Specimens examined:

MASSACHUSETTS: Ashland, *Wheeler*, July, 1883.
CONNECTICUT: Trumbull, *Eames*, September 2, 1895.

PENNSYLVANIA: Pocono Mountains, Monroe County, *Traill Green*, July 16, 1857; same station, *Britton*, July 26, 1893.
MINNESOTA: Near Minneapolis, *Sandberg*, September 17, 1891.

3. **Sium heterophyllum** Greene, Pittonia **2**: 102. 1890.

"Roots fusiform-thickened below the middle; stem stout, notably angular and flexuous, 3 feet high; lowest leaves with a simple lamina which is rather broadly rhombic-lanceolate, serrate, or laciniate-cleft, and 2 to 10 inches long, supported on a stout fistulous petiole; the later radical 3-lobed or divided and passing to the truly pinnate, which have but 2 pairs of broadly lanceolate acute serrate leaflets; the bracts of the involucre broadly lanceolate, tapering at both ends; fruit 1½ lines long, strongly ribbed."

Type locality, "brackish marshes near Suisun, California," where it is associated with *Cicuta bolanderi*.

"It is always aquatic, and as compared with *S. cicutaefolium*, in which the lowest leaves are the most dissected, reverses the order of leaf development." We have not seen this plant.

34. BERULA Hoffm. in Bess. Enum. Pl. Volh. 44. 1821.

Calyx teeth minute. Fruit flattened laterally, nearly round, emarginate at base, glabrous. Carpel nearly globose, with very slender inconspicuous ribs, thick corky pericarp, and no strengthening cells. Stylopodium conical. Oil tubes numerous and contiguous, closely surrounding the seed cavity. Seed terete.

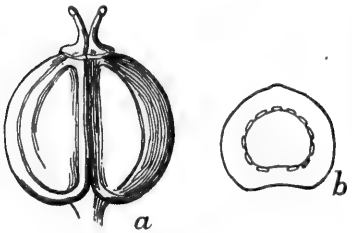


FIG. 32.—Berula erecta: *a*, *b*, ×10.

Smooth aquatic perennial, with simply pinnate leaves and variously cut leaflets, usually conspicuous involucre and involucels of narrow bracts, and white flowers.

A monotypic genus based on *Sium erectum* Huds. of the north temperate regions of both hemispheres.

1. **Berula erecta** (Huds.) Coville, Contr. Nat. Herb. **4**: 115. 1893. FIG. 32.

Sium erectum Huds. Fl. Angl. 103. 1762.
Sium angustifolium L. Sp. Pl. ed. 2. **2**: 1672. 1763.
Berula angustifolia Mert. & Koch, Deutsch. Fl. **2**: 433. 1826.

Erect, 1.5 to 9 dm. high or even smaller; leaflets 5 to 9 pairs, linear to oblong or ovate, serrate to cut-toothed, often laciniately lobed, sometimes crenate, 1 to 7.5 cm. long; umbel many-rayed; rays 5 cm. long or less; pedicels 4 to 6 mm. long; fruit scarcely 2 mm. long.

Type locality not given.

In swamps and streams, Ontario to Texas, westward to British Columbia and California, and extending into Mexico.

Specimens examined:

ILLINOIS: *F. Peck.*

MINNESOTA: Fort Snelling, *Mearns*, September 13, 1891.

SOUTH DAKOTA: Black Hills, near Fort Meade, *Forwood* 141, August 5, 1887; Big Stone, Grant County, *Williams*, August 23, 1892; Black Hills, Hot Springs, *Rydberg* 722, August 10, 1892.

NEBRASKA: Paddock, *Clements* 2802, July 29, 1893.

KANSAS: Reno County, *Carleton* 294, July 10, 1891; Rockport, *Bartholomew*, August 3, 1891.

TEXAS: *Wright* 1105, in 1851–52; *Mex. Bound. Surv.*; San Antonio, *Havard.*

NEW MEXICO: Silver City, *Snow*, August; White Mountains, Lincoln County, *Wooton* 256, July 31, 1897.

COLORADO: San Luis Valley, *Wolf* 732, September, 1873; near Denver, *Letterman* 217, August 20, 1884; near Fort Collins, *Cowen*, July–August, 1893 and 1895.

WYOMING: Yellowstone Park, *Forwood*, August 3, 1881; Little Goose Creek, *A. Nelson* 2275, July 11, 1896; Badger, *A. Nelson* 2766, August 27, 1896.

MONTANA: Great Falls, *Williams* 193, September 27, 1885.

UTAH: Near Glenwood, *Ward* 303, July 3, 1875; Rabbit Valley, *Ward* 595, August 17, 1875; Salt Lake City, *Tracy* 662, August 11, 1887; Provo, *Jones* 5618*a*, July 11, 1894.

ARIZONA: Santa Cruz River, *Smart* 373, in 1867; *Palmer*, in 1869; Bakers Butte, *Toumey* 189, July 19, 1892; Fort Apache, *Shuttleworth*, June 29.

NEVADA: Humboldt Pass, *Watson* 444, September, 1868.

CALIFORNIA: Near Fort Tejon, *Xantus de Vesey* 37, in 1857–58; same station, *Rothrock* 262, August, 1875; near Los Angeles, *Tracy* 396, July 6, 1887; Inyo County, *Coville & Funston* 271, February 7, 1891.

OREGON: Otis Creek, Malheur County, *Leiberg* 2341, June 20, 1896; Wallowa Valley, *Cusick* 2081, August 19, 1898.

WASHINGTON: Coulee City and Wilbur, *Henderson* 2525, July 11, 1892.

BRITISH COLUMBIA: Kamloops, *Macoun* 20, June 17, 1889.

35. **PTILIMNIUM** Raf. Am. Month. **4**: 192. 1819.

Discopleura DC. Coll. Mém. **5**: 38. 1829.

Calyx teeth small or somewhat prominent. Fruit flattened laterally, ovate or oblong, glabrous. Carpel with dorsal and intermediate ribs filiform to broad and obtuse; the laterals very thick and corky, closely contiguous to those of the other carpel, forming a dilated obtuse or acute corky band (except in *P. nuttallii*); all subtended by strengthening cells. Stylopodium conical and prominent, with very short to somewhat elongated styles. Oil tubes solitary in the intervals, 2 on the commissural side. Seed nearly terete (somewhat sulcate beneath the oil tubes) or with flattish face.

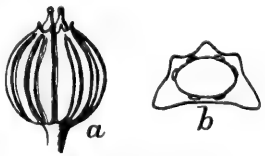


FIG. 33.—Ptilimnium capillaceum: *a*, ×8; *b*, ×10.

Smooth branching annuals, with finely dissected leaves (filiform or lanceolate divisions), involucre of foliaceous bracts, involucels of prominent or minute bractlets, and white flowers.

Type species, *Ammi capillaceum* Michx. Fl. Bor. Am. **1**: 164. 1803.

A genus of at least 3 species, belonging to Eastern United States.

Leaves dissected into filiform divisions.

Involucral bracts cleft or parted; fruit 2 to 3 mm. long..... 1. *P. capillaceum.*

Involucral bracts entire; fruit 1 to 1.5 mm. long..... 2. *P. nuttallii.*

Leaves with lanceolate divisions; fruit large (4 mm. long)..... 3. *P. laciniatum.*

1. **Ptilimnium capillaceum** (Michx.) Raf. Seringe Bull. Bot. 217. 1830.

FIG. 33.

Ammi capillaceum Michx. Fl. Bor. Am. **1**: 164. 1803.

Discopleura capillacea DC. Coll. Mém. **5**: 38. pl. 8. 1829.

Slender and more or less spreading, 3 to 6 dm. high; leaves finely dissected into filiform divisions; umbel 5 to 20-rayed, with involucre of filiform bracts usually cleft or parted, and involucels more or less prominent; rays 0.5 to 3 cm. long; pedicels 3 to 6 mm. long; fruit ovate, 2 to 3 mm. long, with filiform dorsal and intermediate ribs, the laterals forming a broad flat band about the fruit; calyx teeth minute; styles shorter than the stylopodium, sometimes very short; seed face convex.

Type locality, "in campestribus Carolinae."

Wet meadows, mostly near the coast, from Massachusetts to Florida and west to Texas.

Specimens examined:

MASSACHUSETTS: Nantucket, *Miss F. N. Vasey*, August 12, 1897.

CONNECTICUT: Stratford, *Eames*, August 16, 1893.

NEW YORK: Staten Island, *Small*, July 12, 1889.

NEW JERSEY: Woodridge, *Nash* 43, July, 1889; Port Morris, *Holmes* 385, September 9, 1890.

DELAWARE: Kent County, *Holmes* 144, August, 1890.

MARYLAND: Eastern Maryland, *Holmes* 44, July, 1890.

DISTRICT OF COLUMBIA: Near Washington, *Ward*, in 1877.

VIRGINIA: Franklin, Southampton County, *Heller* 1150, July 22–29, 1893; Walnut Point, *Knowlton*, August 17, 1897.

NORTH CAROLINA: *McCarthy*, July, 1885; near Wilmington, *Coville*, June 24, 1890; Rowan County, *Small & Heller* 65, August 13–18, 1891; southeastern North Carolina, *Ashe.*

SOUTH CAROLINA: Aiken, *Ravenel*, July, 1869.

FLORIDA: Near Jacksonville, *Curtiss* 1028, and 4341, 4918, June–July, 1893, 1894; near Eustis, Lake County, *Nash* 837, May 16–31, 1894, and 1930, May 28–June 15, 1895; *Biltmore Herb.* (Chapman coll.) 2161.

ALABAMA: Auburn, Lee County, *Pollard & Maxon* 57, July 9, 1900.

MISSISSIPPI: Madison, *Phares*, in 1883; Ocean Springs, *Miss K. Skeehan*, June 15, 1890.

TEXAS: Hempstead, *Hall* 247, June 12, 1872.

The following forms differ in certain respects from *P. capillaceum* as defined above and may or may not deserve recognition as varieties or species. Field study and a fuller supply of fruiting specimens will be necessary to settle the question.

A form from Allenton, Mo. (*Letterman*, August 27, 1878), has the cleft involucral bracts, fruit ribs, and larger fruit of *P. capillaceum*, and the stouter habit, more prominent stylopodium, longer styles, and range of *P. nuttallii.*

A form from near Hockley, Tex. (*Thurow*, September, 1890), has the cleft involu-

al bracts, fruit ribs, and shorter styles of *P. capillaceum*, and the stouter habit, aller fruit, and larger calyx teeth of *P. nuttallii*.

A form collected in swamps near Wilmington, N. C. (*McCarthy*, July–August, 885), probably represents *Ammi costatum* Ell. Sketch. **1**: 350, 1821 (*Discopleura capillacea costata* DC. Coll. Mém. **5**: 39. pl. 8. fig. B. 1829, and *D. costata* Chap. Manual 162. 1860). It is a much stouter plant, reported to become 12 to 15 dm. high; the leaf segments are very numerous and crowded and appear verticillate. The absence of fruit, however, prevents us from examining the more essential characters. Elliott's statement that *P. capillaceum* is a low and spreading vernal plant, while his *Ammi costatum* is a tall and erect autumnal plant, furnishes good characters, if tenable. Our specimens of both, however, show nothing strikingly different in the spreading or erect habit, or in season; and in the absence of fruit we have nothing but size to distinguish the two forms. The figure of the fruit of *costata* given by De Candolle does not suggest any material difference from *P. capillaceum*.

2. **Ptilimnium nuttallii** (DC.) Britton, Mem. Torr. Club **5**: 244. 1894.

Discopleura nuttallii DC. Coll. Mém. **5**: 38. pl. 9. 1829.
Discopleura capillacea nuttallii C. & R. Bot. Gaz. **12**: 292. 1887.

Resembles *P. capillaceum*, but stouter, 6 to 9 dm. high; rays more numerous; involucral bracts entire, and involucels of smaller bractlets; fruit ovate, 1 to 1.5 mm. long, somewhat constricted beneath the more prominent calyx teeth; stylopodium more prominent, and styles longer and recurved; dorsal and intermediate ribs more prominent, nearly equaling the laterals, which are distinct and do not form a broad flat band.

Type locality, "in North America at Red River;" collected by *Nuttall;* type in Herb. DC., duplicate in Herb. Philad. Acad.

In swamps, from southern Illinois to Alabama and Texas.

Specimens examined:

ILLINOIS: Jackson County, *French*, July 11, 1878.
MISSOURI: Allenton, *Letterman*, in 1881.
ARKANSAS: Fort Smith, *Bigelow*, in 1853–54; near Little Rock, *Mrs. M. H. Taft*, in 1888.
ALABAMA: Northern Alabama, *G. R. Vasey*, in 1878.
INDIAN TERRITORY: *Palmer* 149, in 1868; *Sheldon*, June 13, 1891.
TEXAS: Hempstead, *Hall* 243, June 16, 1872; Sherman, *Mrs. M. L. Nash*, in 1888; Fort Worth, *Dewey*, June 8, 1891.

3. **Ptilimnium laciniatum** (Engelm. & Gray) Kuntze, Rev. Gen. Pl. **1**: 269. 1891.

Daucosma laciniatum Engelm. & Gray, Bost. Jour. Nat. Hist. **6**: 211. 1850. (Pl. Lindh.)

Erect, 6 to 9 dm. high; leaves dissected into lanceolate divisions, or the uppermost linear-setaceous; umbel nearly equally many-rayed with involucre and involucels of numerous 3 to 5-parted setaceous bracts; rays 1 to 3 cm. long; pedicels 4 to 6 mm. long; fruit oblong, about 4 mm. long, with broad and flattish dorsal and intermediate ribs, the laterals forming a prominent acute ridge about the fruit; calyx teeth small; styles recurved, longer than the stylopodium; seed face plane.

Type locality, "high valleys near New Braunfels and on the Upper

Guadaloupe, Texas, covering large patches of moist prairie land, and along the margin of thickets;" collected by *Lindheimer*, in 1845–46; type in Herb. Gray.

Moist meadows, western Texas.

Specimens examined:

TEXAS: *Lindheimer* 404, in 1846; along the Nueces River, *Wright* 232, in 1849; Pedregal Creek, *Wright* 1385, in 1852; Gillespie County, *Jermy* 457, 712; Kerr County, *Heller* 1943, June 26–30, 1894.

36. CYNOSCIADIUM DC. Coll. Mém. 5: 44. 1829.

Calyx teeth persistent. Fruit flattened laterally, ovate to oblong, glabrous. Carpel with prominent ribs, laterals much the largest, forming a broad corky margin (except *C. pinnatum*); a large group of strengthening cells in each rib. Stylopodium conical. Oil tubes solitary in the intervals, 2 on the commissural side. Seed somewhat flattened dorsally, with plane face.

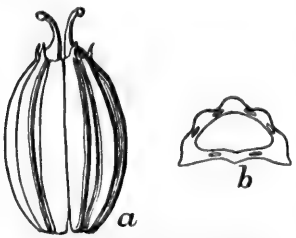


FIG. 34.—Cynosciadium pinnatum: *a*, ×8; *b*, ×10.

Glabrous annuals, with digitately or pinnately divided cauline leaves (leaflets linear to narrowly lanceolate), mostly undivided lower and basal leaves, involucre and involucels of linear bracts, and white flowers.

First species cited, *Cynosciadium digitatum* DC.

A genus of 3 species, belonging to the south central United States.

Cauline leaves digitate; fruit beaked ..... 1. *C. digitatum.*
Leaves pinnate; fruit not beaked.
Fruit with nearly equal ribs; the small calyx teeth inserted some distance below the base of the very prominent stylopodia ... 2. *C. pinnatum.*
Fruit with lateral ribs much the largest; the much larger calyx teeth inserted near the base of the less prominent stylopodia . 3. *C. pumilum.*

1. Cynosciadium digitatum DC. Coll. Mém. 5: 45. pl. 11. fig. A. 1829.

Slender, 3 to 6 dm. high; basal leaves linear-lanceolate, entire; cauline leaves palmately 3 to 5-parted; umbels irregular, mostly 3 to 8-rayed; rays about 2.5 cm. long; pedicels very unequal, 6 to 20 mm. long; fruit ovate, 2 mm. long, contracted into a beak at summit; dorsal and intermediate ribs narrow, laterals broad and corky; calyx teeth minute, much shorter than the stylopodium.

Type locality, "aux environs du fleuve Arkansa;" collected by *Nuttall;* type in Herb. DC., duplicate in Herb. Philad. Acad.

Wet ground, Arkansas to Alabama and eastern Texas.

Specimens examined:

ARKANSAS: Near Little Rock, *Coville* 49, July 9, 1887.

TEXAS: Near Hempstead, *Hall* 255, June 10, 1872; Colorado County, *Joor*, May 27, 1876; near Dallas, *Reverchon*, in 1877, 1879, 1881.

MISSISSIPPI: Meridian, *Tracy* 3262, in 1897.

2. **Cynosciadium pinnatum** DC. Coll. Mém. **5**: 45. pl. 11. fig. B. 1829. Fig. 34.

Slender, 3 to 6 dm. high; cauline leaves pinnately divided into few distant segments, terminal one much the largest; basal leaves similar or often entire; umbels 5 to 10-rayed; rays 1 to 1.5 cm. long; pedicels 2 to 8 mm. long; fruit oblong, 3 mm. long, not beaked at summit; ribs nearly equal (dorsal and intermediates more prominent and laterals less so than in *C. digitatum*); calyx teeth more prominent than in *C. digitatum*, but shorter than the prominent stylopodium and inserted some distance below its base.

Type locality, "aux environs du fleuve Arkansa;" collected by *Nuttall;* type in Herb. DC., duplicate in Herb. Philad. Acad.

From southern Missouri and southern Kansas to eastern Texas.

Specimens examined:

Missouri: McDonald County, *Bush*, July–August, 1892 and 1893.
Kansas: Cowley County, *White*, August, 1898.
Oklahoma: Perkins, *Waugh* 41, June 14, 1893.
Texas: Hockley County, *Thurow*, in 1889; *Nealley* 157, in 1890 and 1892.

3. **Cynosciadium pumilum** (Engelm. & Gray) C. & R.

Cynosciadium pinnatum pumilum Engelm. & Gray, Bost. Jour. Nat. Hist. **5**: 218. 1845 (Pl. Lindh.).

Low and diffuse; leaves as in *C. pinnatum;* rays 3 to 6; fruit short oblong to orbicular, 2 to 3 mm. long; ribs as in *C. digitatum;* calyx teeth much more prominent than in *C. pinnatum*, and inserted near the base of the much less prominent stylopodia.

Type locality, "prairies, Galveston," Tex.; collected by *Lindheimer;* type in Herb. Gray.

Specimens examined:

Texas: Houston, *Hall* 254, April 16, 1872; Hempstead, *Hall* 253, June 8, 1872; Harris County, *Joor*, April 17, 1875; Hockley County, *Thurow*, in 1889; Corpus Christi, Nueces County, *Heller* 1409, March 5–12, 1894; Industry, *Wurzlow*, in 1895; near Houston, *Rose* 4188, May 6, 1899.

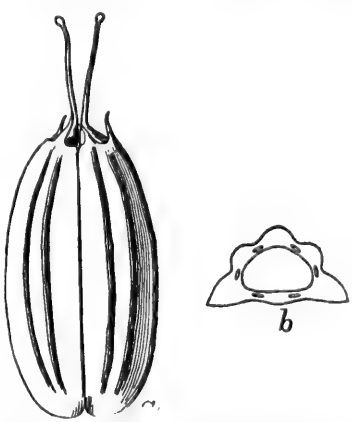


Fig. 35.—Oenanthe sarmentosa californica: *a*, *b*, × 10.

37. **OENANTHE** L. Sp. Pl. **1**: 254. 1753.

Calyx teeth rather prominent. Fruit globose, slightly flattened laterally if at all, glabrous. Carpel (section about semiterete) with broad obtuse corky ribs; laterals the largest; a band of strengthening cells investing seed and oil tubes. Stylopodium very short-conical, with elongated styles. Oil tubes

solitary in the intervals, 2 on the commissural side. Seed sulcate beneath each oil tube (commissural as well as dorsal).

Mostly aquatic glabrous herbs, with succulent stems, pinnate or decompound leaves, and usually involucrate umbels of white flowers.

First species cited, *Oenanthe fistulosa* L.

A genus of about 30 species, all of which belong to the Eastern Hemisphere excepting the following Pacific coast species and a Mexican species.

1. **Oenanthe sarmentosa** Presl., in DC. Prodr. **4**: 138. 1830.

FIG. 35.

Succulent stems 6 to 15 dm. high; leaves ternate and bipinnate; leaflets ovate, acuminate, toothed, often lobed at base, 1 to 2.5 cm. long; umbels many-rayed, with involucre of a few linear bracts or none, and involucels of similar more numerous bractlets; rays 2.5 cm. long or less; pedicels numerous, short; fruit about 4 mm. long, with commissural face (as well as ribs) very corky.

Type locality, "Nootka Sound," Vancouver Island; collected by *Haenke*.

From British Columbia to central California.

Specimens examined:

BRITISH COLUMBIA: Near Victoria, Vancouver Island, *Macoun* 306, July 21, 1893.

WASHINGTON: Grays Harbor, Chehalis County, *Wilkes Exped.;* Cascades, *Kellogg & Harford* 314, in 1868–69; upper valley of the Nesqually, *Allen* 35, August-October, 1893; near Montesano, Chehalis County, *A. A. & E. Gertrude Heller* 3985, June 29, 1898.

OREGON: Near Portland, *Kellogg & Harford* 313, in 1868–69; western Oregon, *Howell*, August, 1880.

CALIFORNIA: Mendocino County, *G. R. Vasey*, in 1875; Plumas County, *Lemmon*, in 1889; Amador County, *Hansen* 323, May 27, 1893; near Mendocino, *Brown* 831, June, 1898.

Oenanthe sarmentosa californica (Watson) C. & R. Rev. N. Am. Umbell. 92. 1888.

Oenanthe californica Watson, Proc. Am. Acad. **11**: 139. 1876.

A more southern form, with usually more approximate and acute or acutish leaflets.

Type locality, "marshes at Point Lobos," California; collected by *Kellogg;* type in Herb. Gray.

From the Bay Region, California, to San Diego County.

Specimens examined:

CALIFORNIA: Near San Diego, *Palmer*, in 1875; near Santa Barbara, *Rothrock*, July, 1875; near Los Angeles, *Hasse*, June 5, 1888, and July, 1891; near Berkeley, *Greene*, April, 1889.

After an examination of the material cited above we can find no reason for changing the conclusion reached in our Revision. The intergrades are too numerous and the characters too slight to recognize in *californica* anything more than a southern form.

In addition to the specimens cited above, which are fairly recognizable as typical

...mentosa and *californica*, we have two others which are not easily disposed of, and ...y indicate the need of further segregation. They are as follows:

A form collected by *C. R. Orcutt* (303, in 1889) in Washington has the open foliage ... *sarmentosa* and the leaflets of *californica* in outline, but very thin in texture. It ...ems impossible to associate it with *sarmentosa*, it is entirely apart from the range ... *californica*, and its leaf texture suggests neither.

A form collected by *Jepson* at Jarvis Landing, Alameda County, Cal., June 19, 1897, ...still more puzzling. It has the compact foliage and leaflet outline of *californica*, but ...he leaflets are smaller, thicker, and strongly reticulate, and the involucels are of ...ery conspicuous bractlets exceeding the flowers and fruit.

For introduced species see page 254.

38. LILAEOPSIS Greene, Pittonia **2**: 192. 1891. [Sept.]

Crantzia Nutt. Gen. **1**: 177. 1818, not of Scopoli (1777).
Hallomuellera Kuntze, Rev. Gen. Pl. **1**: 267. 1891. [Nov.]

Calyx teeth small. Fruit globose, slightly flattened laterally, glabrous. Carpel with filiform dorsal and intermediate ribs; laterals very thick and corky next the commissure; each with a small group of strengthening cells. Stylopodium depressed. Oil tubes solitary in the intervals, 2 on the commissural side. Seed terete.

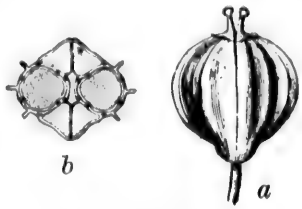


FIG. 36.—Lilaeopsis lineata.

Small glabrous perennials, creeping and rooting in the mud, with leaves reduced to hollow cylindrical or awl-shaped petioles (jointed by transverse partitions), minute involucral bracts, and simple few-flowered umbels of white flowers.

Type species, *Hydrocotyle lineata* Michx. Fl. Bor. Am. **1**: 162. 1803.

A genus of world-wide distribution, generally treated as monotypic, but we recognize the 4 following North American species:

Fruit with lateral ribs prominently corky thickened, much more conspicuous than the dorsal ones, which are not at all corky.
  Peduncles longer than the leaves ..... 1. *L. lineata.*
  Peduncles much shorter than the leaves ..... 2. *L. occidentalis.*
Fruit with all the ribs corky thickened, the laterals more prominent; peduncles much shorter than the leaves.
  Leaves broadening above into a spatulate or oblong blade; dorsal ribs sharply acute ..... 3. *L. carolinensis.*
  Leaves filiform or linear; dorsal ribs obtuse ..... 4. *L. schaffneriana.*

1. **Lilaeopsis lineata** (Michx.) Greene, Pittonia **2**: 192. 1891. FIG. 36.

Hydrocotyle lineata Michx. Fl. Bor. Am. **1**: 162. 1803.
Crantzia lineata Nutt. Gen. **1**: 178. 1818.
Hallomuellera lineata Kuntze, Rev. Gen. Pl. **1**: 267. 1891.

Leaves short, 2 to 5 cm. long, linear-spatulate; peduncles longer than the leaves, 3 to 7 cm. long.

Type locality, "in inundatis Carolinae inferioris."

Along the Atlantic and Gulf coasts from Massachusetts to Mississippi.

Specimens examined:

MASSACHUSETTS: Wareham, *Kennedy*, July 8, 1890.

CONNECTICUT: New Haven, *Dana;* same station, *Wright*, in 1884; Milford, *Eaton* June–August, 1895.

RHODE ISLAND: Providence, *Olney*, July 22, 1845; same station, *N. L. Britton* August 10, 1878.

NEW JERSEY: *Nuttall* (with no station given).

VIRGINIA: Colonial Beach, *Orville*, July 6, 1890.

FLORIDA: *Chapman* (no station given); near Jacksonville, *Torrey;* Tampa, *Garber* May, 1876; near Jacksonville, *Curtiss* 993, also 4341, May 9, 1893, and 4915, June 19, 1894.

2. **Lilaeopsis occidentalis** C. & R. Bot. Gaz. **24**: 48. fig. 2. 1897.

FIG. 37.

Leaves elongated linear, narrowing above, 3 to 18 cm. long; peduncles much shorter than the leaves, 2 to 4 cm. long.

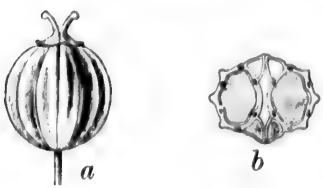


FIG. 37.—Lilaeopsis occidentalis.

Type locality, "wet places on coast of Yakima Bay, Oregon;" collected by *Hall*, no. 205, in 1871; type in U. S. Nat. Herb.

Coast region from Oregon to British Columbia and southern Alaska.

Specimens examined:

OREGON: Type specimens as cited under type locality; salt marshes of Tillamook Bay, *Howell*, July 11, 1882; same station, *Henderson* 403, July 14, 1882; near Astoria, *Meehan*, August, 1883.

WASHINGTON: Puget Sound, *Wilkes Exped.;* Seattle, *Piper* 642, June 20, 1889; Lake Washington, King County, *Suksdorf* 972, August 4, 1890.

BRITISH COLUMBIA: Chase River, Vancouver Island, *Macoun*, June 3, 1887; near Como, Vancouver Island, *Macoun*, July 1, 1893.

ALASKA: *Meehan*, July, 1883.

3. **Lilaeopsis carolinensis** C. & R. Bot. Gaz. **24**: 48. fig. 4. 1897.

FIG. 38.

Leaves very narrow and elongated below, broadening above into a spatulate or oblong blade, 5 to 25 cm. long, 4 to 15 mm. broad; peduncles very short, 1 to 1.5 cm. long; dorsal ribs sharply acute.

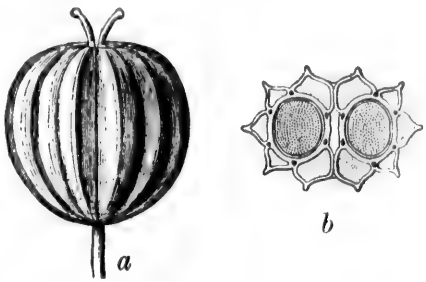


FIG. 38.—Lilaeopsis carolinensis.

Type locality, "eastern North Carolina;" collected by *McCarthy*, in 1884; type in U. S. Nat. Herb.

North Carolina and Louisiana; will doubtless be found in the intervening region.

mens examined:

North Carolina: Type specimens as cited under type locality.

Louisiana: New Orleans, *Joor.*

Lilaeopsis schaffneriana (Schlecht.) C. & R. Bot. Gaz. **24**: 48. fig. 3. 1897. Fig. 39.

Crantzia schaffneriana Schlecht. Linnaea **26**: 370. 1853.

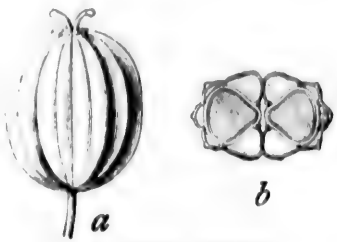


Fig. 39.—Lilaeopsis schaffneriana.

Leaves when growing in drier places almost filiform and short, 6 mm. long; when growing in water elongated linear, 20 to 30 cm. long; peduncles very short; fruit oblong, the dorsal ribs obtuse.

Type locality, "in lacu [laguna] ad urbem Mexico," near Chapultepec, Mexico; collected by *Schaffner*.

Southern Arizona, and southward through Mexico to Chile.

Specimens examined:

Arizona: Santa Cruz Valley near Tucson, *Pringle*, May 19, 1881; springs in Huachuca Mountains, *Lemmon*, August, 1882.

39. PODISTERA Watson, Proc. Am. Acad. **22**: 475. 1887.

Calyx teeth prominent. Fruit flattened laterally, elliptic-ovate, glabrous. Carpel oblong-pentagonal in cross section, the ribs slender and distinct. Stylopodium depressed; styles long and ribbon-like. Oil tubes 2 or 3 in the intervals, 6 on the commissural side.

Fig. 40.—Podistera nevadensis: *a*, × 6; *b*, × 12.

A dwarf cespitose acaulescent perennial, with pinnately parted leaves, no involucre, involucels of foliaceous 3 to 5-cleft bractlets (by the reduction of the rays often forming a false involucre), and white or pinkish flowers.

A monotypic genus (based on *Cymopterus nevadensis* Gray) found as yet only near the top of Mount Dana, California.

1. **Podistera nevadensis** (Gray) Watson, Proc. Am. Acad. **22**: 475. 1887. Fig. 40.

Cymopterus nevadensis Gray, Proc. Am. Acad. **6**: 536. 1865.

Puberulent; caudex with numerous very short crowded branches bearing tufts of leaves; leaves small, 6 to 8 mm. long, rather thick, the 3 to 7 lanceolate segments acute and entire; peduncles short, but exceeding the tufts of leaves; umbels of 3 to 5 umbellets which are

either sessile or with very short rays; involucels as long as umbellets; fruit little more than 2 mm. long, nearly sessile.

Type locality, "at and near the top of Mount Dana," California, at 3,900 meters altitude, forming large dense convex mats among the rocks; collected by *Brewer*, nos. 1739, 2717, June, 1863, in flower; type in Herb. Gray. Associated in the original description with the type specimens is *Lemmon* 1424, August, 1878, in fruit.

Specimens examined:

CALIFORNIA: Type locality, *Lemmon*, September, 1877, and in 1898.

40. **EURYTAENIA** Torr. & Gray, Fl. 1: 633. 1840.

Calyx teeth prominent. Fruit strongly flattened dorsally, ovate, minutely scabrous. Carpel with dorsal and intermediate ribs approximate and filiform (rarely slightly winged); laterals very prominent, thick-winged (prominently nerved on the commissural side), but with

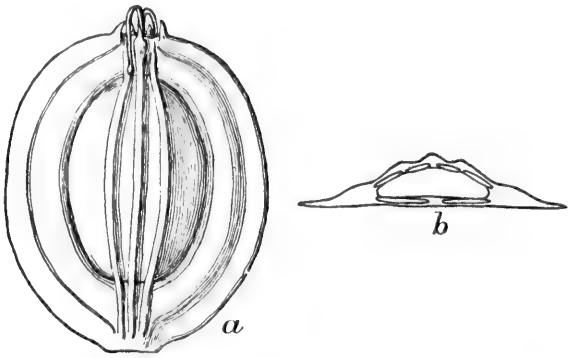


FIG. 41.—Eurytaenia texana: *a*, *b*, ×8.

thin margins contiguous with those of the other carpel; all (especially the laterals) with prominent groups of strengthening cells. Stylopodium depressed. Oil tubes very broad, filling the intervals, 2 remarkably broad ones on the commissural side. Seed face plane.

Glabrous (or somewhat scabrous especially on the rays) branching herbs, with pinnately dissected leaves, involucre and involucels of usually 3-cleft bracts, and white flowers.

A monotypic genus belonging to the sandy soils of eastern Texas and adjacent Indian Territory and Oklahoma.

1. **Eurytaenia texana** Torr. & Gray, Fl. 1: 633. 1840. FIG. 41.

From 3 to 8 dm. high; leaflets long, narrowly linear to oblong, entire, serrate, toothed, or even incised; umbels 8 to many-rayed; rays 2.5 to 6 cm. long; pedicels very short; fruit 4 mm. long.

Type locality, Austin, "Texas;" collected by *Drummond;* type in Herb. Gray.

Specimens examined:

TEXAS: Hempstead, *Hall* 256, June 10, 1872; near Fort Worth, *Reverchon*, June, 1879; Hood County, *Reverchon*, June, 1882; *Nealley*, in 1888 and 1889.

OKLAHOMA: Huntsville, Kingfisher County, *Laura Blankinship*, June 5, 1896; Anadarko, *Sheldon* 167, July 17, 1891.

41. **SPHENOSCIADIUM** Gray, Proc. Am. Acad. **6**: 536. 1865.

Calyx teeth obsolete. Fruit flattened dorsally, cuneate-obovate, hirsute. Carpel strongly flattened dorsally, strongly ribbed at base, winged above; dorsal and intermediate wings narrow, lateral broader. Stylopodium small and conical (or flat in flower). Oil tubes solitary in the intervals, 2 on the commissural side. Seed face plane.

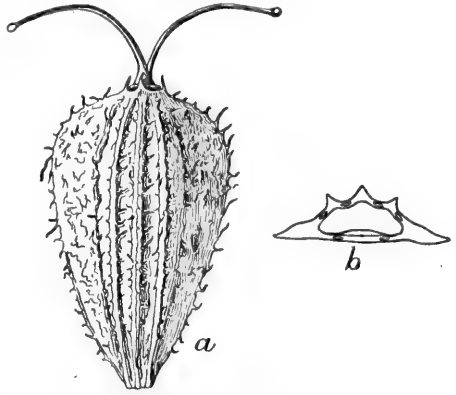


FIG. 42.—Sphenosciadium capitellatum: *a*, *b*, × 6.

Nearly simple thick-rooted perennials, with stout stems glabrous up to the tomentose umbel, once or twice pinnate leaves with bladdery dilated petioles, no involucre, involucels of numerous linear-setaceous bractlets, and scarious white or sometimes purplish flowers sessile on an enlarged receptacle and forming a compact head.

Type species, *Sphenosciadium capitellatum* Gray.

A genus of at least 2 species, belonging to the Sierra Nevada of California and adjacent Nevada, northward to eastern Oregon and Idaho.

This species was merged under *Selinum* by Bentham & Hooker, but it seems to us entirely worthy of restoration. Its inflorescence is very peculiar, and the discovery of one if not more additional species confirms its generic rank.

Foliage glabrous; fruit about 5 mm. long ..... 1. *S. capitellatum.*
Foliage somewhat scabrous; fruit about 7 mm. long ..... 2. *S. cymgiifolium.*

1. **Sphenosciadium capitellatum** Gray, Proc. Am. Acad. **6**: 537. 1865. FIG. 42.

Selinum capitellatum Watson, Bot. King Surv. 126. 1871.

Very stout, 3 to 15 dm. high; leaves large and glabrous; the leaflets oblong to linear-lanceolate, 2.5 to 5 cm. long, with rather few laciniate teeth or lobes, more or less entire below; umbel equally 4 to 15-rayed, with globose umbellets of sessile pubescent flowers having involucels of a few deciduous bractlets; rays 2.5 to 5 cm. long; fruit cuneate-obovate, about 5 mm. long.

Type locality, "in the Sierra Nevada, near Ebbett's Pass [Alpine County, Cal.], by a stream, in flower;" collected by *Brewer;* type in Herb. Gray. Associated with the type in the original description is *Anderson*, from near Carson City, Nev., in fruit.

Along streams, from the mountains of northeastern California and adjacent Nevada to eastern Oregon and Idaho.

Specimens examined:

CALIFORNIA: Plumas County, *Mrs. R. M. Austin;* Sierra County, *Lemmon*, June, 1889; Hermit Valley, Alpine County, altitude 2,700 meters, *Hansen* 324, August 23, 1893; Colby, Butte County, *Mrs. C. C. Bruce*, July, 1896; near Lassen Buttes, Plumas County, *Brown* 608, August 1–15, 1897.

OREGON: Subalpine bogs and wet meadows, *Cusick* 1392, September, 1886; Crook County, altitude 1,270 meters, *Leiberg* 464, July 18, 1894; near Shirk, Harney County, altitude 1,500 meters, *Leiberg* 2605, July 19, 1896; Alvord Valley, base of Steins Mountains, *Cusick* 2034*a*, July 15, 1898.

IDAHO: Near Ketchum, *Henderson* 3405, July 23, 1895.

The Oregon and Idaho specimens are of the narrower-leaved type; and *Leiberg* 2605 has foliage slightly roughened.

2. **Sphenosciadium eryngiifolium** (Greene) C. & R.

Selinum eryngiifolium Greene, Pittonia **2**: 102. 1890.

Resembling *S. capitellatum*, but smaller; leaves paler and somewhat scabrous, bipinnate or the primary divisions appearing ternate, more dissected; segments narrower and more confluent, fewer toothed or lobed and with pungent tips, and more elongated cuneate base; fruit about 7 mm. long, with more prominent wings.

Type locality, "near the Yosemite Valley, California;" collected by *Elmer Drew*, June, 1889.

Dry soil, mountains of southern California.

Specimens examined:

CALIFORNIA: San Jacinto Mountains, *Parish* 986, August, 1881; headwaters of Keweah River, Tulare County, altitude 2,750 meters, *Coville & Funston* 1475, August 4, 1891; Yosemite Valley, *Canby*, August 15, 1895; San Jacinto Mountains, altitude 2,700 meters, *H. M. Hall* 720, July 22, 1897.

Two additional forms can not be referred to either of the above species, but our material is too meager to justify definite characterization. They are as follows:

A form from the southern Sierras of California, collected by *Rothrock* (no. 386), September, 1875, at an altitude of 2,940 meters, has the general characters of *S. eryngiifolium*, but the leaflets are elongated linear and mostly entire.

A form from Fresno County, Cal., collected by *Mrs. Rawson Peckinpah*, October, 1890, has large leaves, with large and crowded lanceolate to ovate, irregularly serrate or toothed, more or less confluent segments; rays more slender and elongated, bearing smaller heads. The plant has the pallid look and somewhat scabrous foliage of *S. eryngiifolium*, but otherwise seems quite distinct. Our specimen is in young flowering condition.

The following species, recently described as *Selinum validum* by Mr. J. W. Congdon, in Erythea 7:185. 1900, certainly belongs in the genus *Sphenosciadium*, but whether it is specifically distinct or not we are not prepared to state. Mr. Congdon promised us material, but was not able to furnish it in time for this paper. His description is here published in full. We suspect that the plant is only an altitudinal variation.

"Plant stout, tall, unusually strong pubescent in all its parts. Stems 3 to 6 feet high, leafy. Leaves biternately or bipinnately divided, usually broadly ovate in outline, sometimes nearly a foot in diameter; the ultimate leaflets usually ovate, serrate,

gually acuminate, 1 to 2 feet long. Fruit and inflorescence about the same as in *S. capitellatum* Benth. & Hook.

The present species, *S. capitellatum*, and *S. eryngiifolium* Greene, are three closely related and perhaps confluent forms. Their inflorescence and fruit are almost identical, but they differ greatly in foliage and in general appearance. *S. capitellatum* is often nearly or quite glabrous, with rather slender few-leaved stems and long peduncled umbels; the leaves long-petioled, pinnately or bipinnately divided; the ultimate leaflets narrowly oblong to lanceolate. It is in our region mostly confined to the east side of the main Sierra. *S. eryngiifolium* has a more condensed growth, with leafy stems and shorter peduncled heads; the leaves bipinnately dissected into oblong or lanceolate very acute or mucronate ultimate segments only one-fourth to one-half inch long. It grows for the most part in the high mountains at 8,000 to 11,000 feet. *S. validum* differs in the particulars named above, and belongs to the western slope of the mountains, descending with the streams to the foothills. It is particularly abundant near Wawona."

42. LIGUSTICUM L. Sp. Pl. 1: 250. 1753.

Calyx teeth small or obsolete. Fruit oblong or ovate, flattened laterally if at all, glabrous. Carpel with all the ribs prominent and equal (intervals broad), acute or sometimes slightly winged, a group of strengthening cells beneath each rib. Stylopodium conical. Oil tubes 2 to 6 (mostly 3 to 5) in the intervals, 6 to 10 on the commissural side. Seed with round or angled back; face from plane to deeply concave, with or without a central longitudinal ridge.

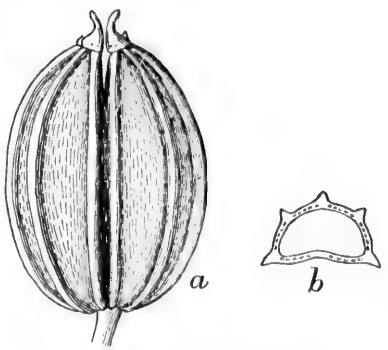


FIG. 43.—Ligusticum canadense: *a*, *b*, × 8.

Smooth perennials from large aromatic roots, with usually large ternately or ternate-pinnately compound leaves (simply pinnate in two species), mostly no involucre, usually involucels of narrow bractlets, and white or pinkish flowers in large many-rayed umbels.

First species cited is *Ligusticum levisticum* L., which is the type of the genus *Levisticum*. The second species cited is *Ligusticum scothicum*, the only Linnæan species remaining in the genus.

A genus of about 50 species, widely distributed throughout the Northern Hemisphere, but also in Chile and New Zealand; 21 species are described as belonging to the United States and Canada, but this number will probably be increased.

Leaves with at least the primary divisions ternate.
- Leaves ternately decompound, with broad leaflets simply toothed or serrate; eastern species (or high northern).
  - Stem branched above; leaves large, 3 to 4-ternate ..... 1. *L. canadense.*
  - Stem simple; leaves biternate ..... 2. *L. scothicum.*
- Leaves ternate-pinnately compound; western species.
  - Leaflets large and broad, serrate or toothed ..... 3. *L. verticillatum.*

Leaflets small, laciniately toothed or pinnatifid.
Stems more or less leafy.
Fruit merely ribbed, not at all winged.
Glabrous throughout; fruit narrowly oblong ..... 4. *L. californicum.*
Inflorescence puberulent; fruit broadly oblong.
Leaflets coarsely toothed or lobed ..... 5. *L. apiodorum.*
Leaflets deeply cleft into linear lobes ..... 6. *L. apiifolium.*
Fruit more or less winged.
Leaflets more or less confluent ..... 7. *L. canbyi.*
Leaflets more or less distinct.
Fruit 4 to 5 mm. long.
Involucels none ..... 8. *L. leibergi.*
Involucels present ..... 9. *L. simulans.*
Fruit 6 to 7 mm. long.
Ultimate leaf divisions narrowly linear ..... 10. *L. filicinum.*
Ultimate leaf divisions not narrowly linear.
Pedicels 6 to 8 mm. long; inflorescence puberulent or glabrous ..... 11. *L. porteri.*
Pedicels slender, 8 to 15 mm. long; glabrous throughout ..... 12. *L. goldmani.*
Stems naked or nearly so, giving an acaulescent appearance.
Leaves with ultimate divisions narrowly linear to filiform. 13. *L. tenuifolium.*
Leaves with ultimate divisions broader.
Flowers purple or purplish ..... 14. *L. purpureum.*
Flowers white.
Leaflets small and crowded.
Rays 1 to 2 cm. long ..... 15. *L. grayi.*
Rays 2.5 to 5 cm. long ..... 16. *L. oregannm.*
Leaflets larger and distant.
Rays 5 cm. long or more ..... 17. *L. eusickii.*
Rays 2.6 to 3.5 cm. long ..... 18. *L. pringlei.*
Low acaulescent plants with simply pinnate leaves.
Involucre conspicuous; Alaskan ..... 19. *L. macounii.*
Involucre wanting or of 1 or 2 bracts; mountains of southwest Colorado ..... 20. *L. eastwoodae.*

1. Ligusticum canadense (L.) Britton, Mem. Torr. Club **5**: 240. 1894. FIG. 43.

Ferula canadensis L. Sp. Pl. **1**: 247. 1753.
Ligusticum actaeifolium of authors, not of Michx.

Stem stout, branched above, 6 to 18 dm. high, leafy, with somewhat puberulent inflorescence; leaves large, 3 to 4-ternate; leaflets 5 to 13 cm. long, variable in size and toothing, usually large and ovate or oblong (often broadly so), and coarsely serrate, sometimes small and lanceolate and sparsely toothed or even entire; umbel 10 to 20-rayed, with involucels of few short bractlets; rays (fruiting) 2.5 to 5 cm. long; pedicels 2 to 4 mm. long; fruit ovate, 4 to 6 mm. long, with prominent somewhat winged ribs; oil tubes 3 or 4 in the intervals, 6 on the commissural side.

Type locality, "Virginia;" collected by *Clayton.*

From southern Pennsylvania to Georgia, and west to Missouri.

Specimens examined:

VIRGINIA: Peaks of Otter, Bedford County, altitude 1,050 meters, *Curtiss*, July 26, 1871; Peak Mountain, Pulaski County, altitude 660 meters, *Small*, July 16, 1892.

NORTH CAROLINA: Statesville, *Hyams*, August, 1877; mountains, *G. R. Vasey*, in 1878; Roan Mountain, altitude 1,200 meters, *Chickering*, July 1, 1880; Linville, *Kelsey*, September, 1890; summit of Table Rock Mountain, Burke County, *Small & Heller* 66, July 2, 1891; Swain County, altitude 540 meters, *Beardslee*, August 5, 1891; near Columbus, Polk County, *Townsend*, July 2, 1897; Biltmore and Highlands, Macon County, *Bilt. Herb.* 5549, August–September, 1897.

GEORGIA: Yellow River, Gwinnett County, altitude 225 meters, *Small*, July 11, 1893; Lookout Mountain, *Ruth* 425, July, 1898.

ALABAMA: Gadsden, Etowah County, *Pollard & Maxon*, July 29, 1900.

TENNESSEE: Cocke County, *Kearney* 702, August 25, 1897.

MISSOURI: Shannon County, *Bush*, June 1, 1890.

The type locality of *Ligusticum actaeifolium* Michx. Fl. **1**: 166. 1803, a species persistently associated with the above, is "on the banks of the St. Lawrence, near Tadousac," which is in the Province of Quebec at the mouth of the Saguenay. Both the description and the type locality forbid association with a species not reported north of southern Pennsylvania, and chiefly developed still farther south. What *L. actaeifolium* represents is not clear, but it is probably the *Coeloplearum* of the North Atlantic region, which is common on the lower St. Lawrence, and was found by Pringle in Temiscouata, just across the St. Lawrence from Tadousac.

2. **Ligusticum scothicum** L. Sp. Pl. **1**: 250. 1753.

Stem simple, 3 to 6 dm. high, somewhat leafy, with glabrous inflorescence; leaves biternate; leaflets ovate to obovate or nearly rotund, 2.5 to 5 cm. long, coarsely toothed; umbel 8 to 15-rayed, with involucre of 1 to 8 linear bracts, and involucels of several linear bractlets; rays (fruiting) 2.5 to 7.5 cm. long; flowers often pinkish; calyx teeth small, persistent; fruit narrowly oblong, 4 to 6 mm. long, with prominent somewhat winged ribs; oil tubes small, 2 or 3 in the intervals, 6 on the commissural side.

Type locality, "ad litora Maris in Anglia, Suecia."

Salt marshes along the east coast from Labrador (and up the St. Lawrence) to Connecticut; along the entire Alaskan coast; also coasts of northern Asia and Europe.

Specimens examined:

LABRADOR: *Kenaston*, in 1891; Capisan Island, *Waghorne*, August 14, 1894.

NEWFOUNDLAND: Crevices of cliffs, Placentia, *Robinson & Schrenk*, August 24, 1894.

NEW BRUNSWICK: Charlo, Restigouche, *Fowler*, July 30, 1874.

QUEBEC: Rocky shores of the St. Lawrence, Province of Temiscouata, *Pringle*, in 1879.

MAINE: Shore of Bakers Island, *Redfield*, July 23, 1890.

MASSACHUSETTS: Marthas Vineyard, *Burgess*, August, 1889; on Buzzards Bay near Juisseti, in herb. *Walter Deane.*

ALASKA: Fort St. Michael, Norton Sound, *Bannister*, in 1865–66; Sitka, *Kellogg* 181, in 1867; Shumagin Island, *Harrington*, in 1871–72; Unalaska, the *Albatross*, July, 1888; Port Chester, *Fassett*, July, 1890; Unalaska, *James Macoun*,

July 25, 1891; shore of Gastineaux Channel, *Grace E. Cooley*, July 31, 1891, St. Paul and Unalaska Islands, *Merriam*, July 26-August 12, 1891; Yakutat Bay, *Funston* 70, July 18, 1892; Unalaska and Amaknak Islands, *Eerrmann* 150, 170, August 2, 1892; Yes Bay, *Gorman* 56, June 30, 1895; same station *Howell* 1629, August 6, 1895; Pribilof (St. Paul) and Unalaska (Dutch Harbor) islands, *True & Prentiss* 93, 134, August 18–29, 1895; Dyea, *Canby* 97, August 28, 1897; Prince William Sound (Virgin Bay), Kukak Bay, and Unalaska, *Coville & Kearney* 1214, 1674, 1760, June–July, 1899; Yakutat Bay, Prince William Island, Shumagin, Unalaska, Kadiak, *Trelease* 4531, 4532, 4533, 4534, 4538, 4542, June 22–July 19, 1899; Yakutat Bay, *Saunders* 4530, June 20, 1899; Kadiak, Sand Point, Cape Karluk, *Brewer & Coe* 228, 276, 491, July 2–19, 1899.

3. **Ligusticum verticillatum** (Geyer) C. & R. Contr. Nat. Herb. **3**: 320, pl. 12. 1895.

Thapsia verticillata Geyer, Jour. Bot. **6**: 233. 1847.
Angelica verticillata Hook. Jour. Bot. **6**: 233. 1847.

Glabrous throughout, or inflorescence somewhat rough, rather stout, 6 to 7 dm. high; leaves once or twice ternate then pinnate; leaflets large, 2.5 to 7.5 cm. long, ovate to oblong, serrate or toothed, occasionally somewhat lobed (unusually simple for a western *Ligusticum*), pale beneath; umbel unequally many-rayed, rather compact, with no involucels; fruiting rays 2.5 to 7.5 cm. long; pedicels 6 to 12 mm. long; fruit oblong, 6 mm. long, with distinctly winged ribs; stylopodium low conical.

Type locality, "shady grassy borders of pine woods, on high plains of the Nez Perces Indians;" collected by *Geyer*, no. 414, in 1841; type lost, according to Hemsley.

Idaho.

Specimens examined:

IDAHO: Near Forest, Nez Perces County, altitude 1,050 meters, *A. A. & E. Gertrude Heller*, 3453, July 21, 1896; Craig Mountains, *Henderson*, 2665, June 24, 1894.

4. **Ligusticum californicum** C. & R., sp. nov.

Resembling *L. apiodora*, but glabrous throughout; leaves not so large, once or twice ternate then pinnatifid; leaflets ovate, obtuse, usually rounded at base, incised-pinnatifid; fruit narrowly oblong, 4 mm. long, with filiform ribs; stylopodium more slender conical.

Type locality, Covelo, Mendocino County, Cal.; collected by *Chesnut*, July-August, 1897; type in U. S. Nat. Herb.

Only known from the type locality.

5. **Ligusticum apiodorum** (Gray) C. & R.

Pimpinella apiodora Gray, Proc. Am. Acad. **7**: 345. 1868.

Glabrous except the puberulent inflorescence and scabrous leaf margins; rather stout, 6 to 9 dm. high; leaves ternately decompound; leaflets more or less distinct below, confluent above, pale beneath, oblong or somewhat cuneate, incised; umbels 6 to 15-rayed, with involucels

of linear or setaceous bractlets; rays 2.5 to 5 cm. long; pedicels 6 to 8 mm. long; flowers white or pinkish; fruit broadly oblong, 3 to 4 mm. long, with sharp filiform ribs; stylopodium low, broad conical; oil tubes numerous in the intervals (4 or 5 in the dorsal, 6 in the laterals), 8 or more on the commissural side.

Type locality, "rocky hills along the coast of California from Mendocino County to San Francisco," collected by *Bolander;* type in Herb. Gray.

In the coast region from San Francisco, Cal., to western Oregon.

Specimens examined:

CALIFORNIA: Sausalito, Marin County, *Kellogg & Harford* 310, in 1868–69; Mendocino County, *G. R. Vasey*, in 1875; Lagunitas, Marin County, *Alice Eastwood*, July, 1894; Sausalito, Marin County, *Alice Eastwood*, June, 1898.

OREGON: "Dry open woods, western Oregon," *Howell*, June, 1880; Portland, *Henderson*, in 1882.

Pimpinella apiodora nudicaulis Gray, Proc. Am. Acad. **8**: 385. 1872, is to be referred to *Ligusticum*, but we have not been able to refer the material definitely to any described species. The type is a small flowering specimen now in Herb. Gray, and was collected by *Hall* (no. 206) in Oregon in 1871.

6. **Ligusticum apiifolium** (Nutt.) Gray, Proc. Am. Acad. **7**: 347. 1868.

Cynapium apiifolium Nutt. in Torr. Gray Fl. **1**: 641. 1840.

Glabrous except the puberulent inflorescence and scabrous leaf margins; stems sometimes tall (9 to 12 dm.), with 1 to 3 small leaves; leaves twice or thrice ternate then pinnate; segments usually distinct, ovate, deeply cleft into linear usually entire and acute lobes scarcely paler beneath; umbel many-rayed, with involucels of linear bractlets; rays 5 to 10 cm. long; pedicels 6 to 10 mm. long; fruit broadly oblong, 4 mm. long, sharply ribbed; stylopodium low conical; oil tubes 3 to 5 in the intervals, 4 to 8 on the commissural side.

Type locality, "plains of Oregon, near the confluence of the Wahlamet;" collected by *Nuttall*, June–July; type in Herb. Philad. Acad., fragments of type in Herb. Gray.

In the lower Columbia River region of Oregon and Washington.

Specimens examined:

OREGON: Type specimens as cited under type locality; Oregon City, *Kellogg & Harford* 314, July, 1869; *Hall* 207, in 1871; Sauvies Island, Multnomah County, *Howell;* Portland, *Henderson*, in 1882.

WASHINGTON: Near Montesano, Chehalis County, *Henderson* 2578, June 25, 1892; same station, *A. A. & E. Gertrude Heller* 3973, June 28, 1898.

An examination of the type specimens, and of good material from the type locality, has enabled us to come to an understanding of this species. In the Gray Herbarium there is also a sheet of Nuttall's *Cynapium nudicaule*, which was included in *L. apiifolium*. The specimen is only in flower, but the different foliage suggests a distinct species.

7. **Ligusticum canbyi** C. & R. Rev. N. Am. Umbell. 86. 1888.

Stem about 6 dm. high, with alternate peduncles, leafy at base, with a small cauline leaf or two, and glabrous inflorescence; leaves large,

biternate; leaflets lanceolate, 7.5 to 10 cm. long, pinnately parted below, then confluent, finally toothed above, the larger segments more or less laciniately toothed (teeth and lobes not so sharp as in *L. verticillatum*); umbel of numerous rays, with involucels of elongated (1 to 2 cm.) linear bractlets; rays 5 cm. long; pedicels 10 to 12 mm. long; fruit (immature) with long slender conical stylopodium and prominent winged ribs; oil tubes 5 or 6 in the intervals, 6 to 8 on the commissural side.

Type locality, "low grounds, near head waters of Jocko River, Montana;" collected by *Canby*, no. 155, July 16, 1883; type in Herb. Canby (now in College of Pharmacy, New York City).

In the mountains of northwestern Montana, northern Idaho, northeastern Washington, and adjacent British Columbia.

Specimens examined:

MONTANA: Type specimens as cited under type locality.

IDAHO: Pend Oreille River, *Lyall*, in 1861; head of Bear Creek, Bitter Root Forest Reserve, altitude 2,000 meters, *Leiberg* 2978, September 1, 1897.

WASHINGTON: "From Fort Coville to Rocky Mountains," *Lyall*, in 1861 (this may be an Idaho station; the label also cites "Galton Mountains, altitude 5,000 feet").

BRITISH COLUMBIA: Donald, Columbia Valley, *Macoun*, July 13, 1885.

8. **Ligusticum leibergi** C. & R., sp. nov. PLATE IV.

Glabrous, except the slightly roughish inflorescence; stem tall, somewhat leafy, usually with verticil of 3 to 7 peduncles surrounding the stouter and larger central one; leaves large, twice ternate, then pinnate; segments lanceolate, acuminate, laciniately cleft into narrow sharp-pointed and sometimes toothed lobes; lateral peduncles 1 to 3 dm. long (the umbels often sterile), the central one 2 to 4 dm. long; umbel equally many-rayed, with no involucels (rarely a bractlet or two); rays 2.5 to 5 cm. long; pedicels 8 to 12 mm. long; fruit oblong, 4 to 5 mm. long, with thin narrow wings; stylopodium conical.

Type locality, Traille River Basin, Kootenai County, Idaho; collected by *Leiberg*, no. 614, June–August, 1891; type in U. S. Nat. Herb.

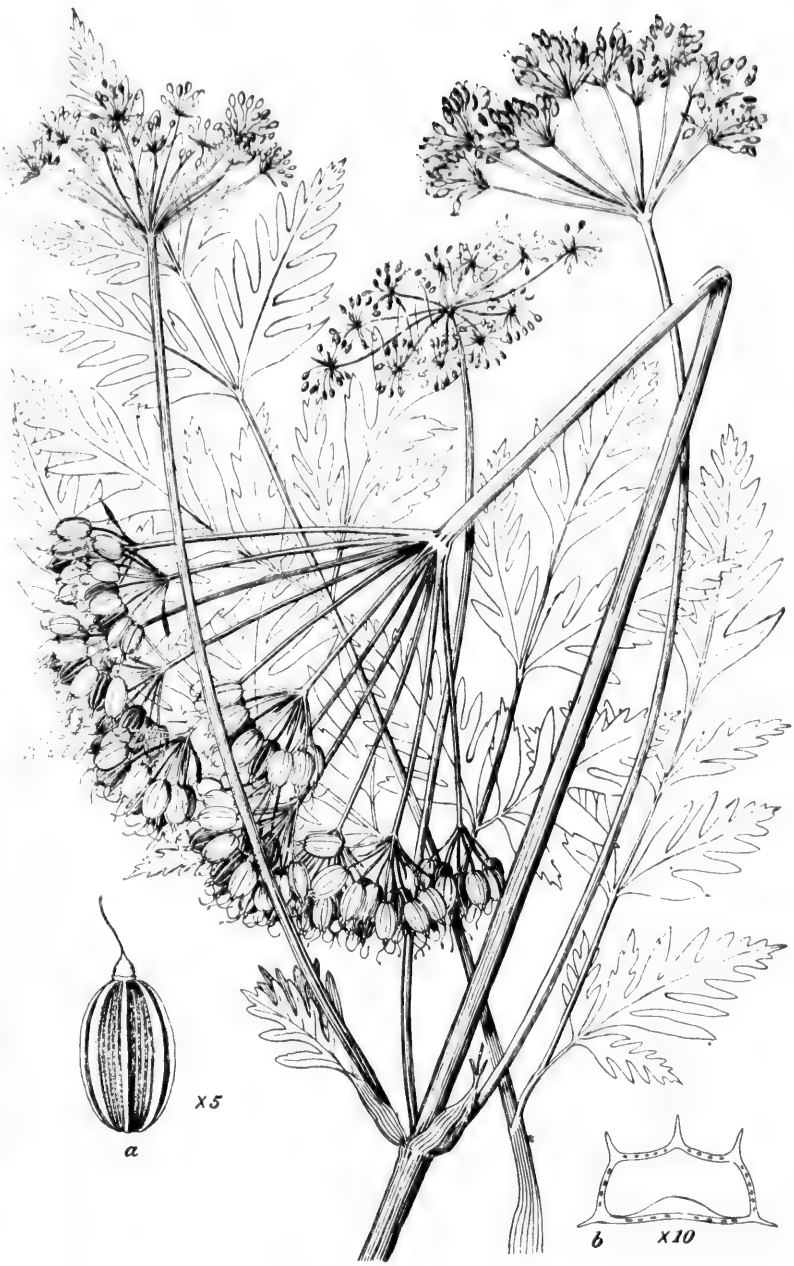
Idaho and eastern Washington.

Specimens examined:

IDAHO: Traille River Basin, Kootenai County, *Leiberg* 614, June–August, 1891; Lake Cœur d'Alene, Kootenai County, *Sandberg* 535, July 2, 1892; St. Maries, Kootenai County, *Henderson* 2663, 2664, August 3, 1894; Desmet, Kootenai County, altitude 850 meters, and Sohans Pass, altitude 1,650 meters, *Leiberg* 9, 429, June–August, 1895; Priest River Range, altitude 1,500 meters, *Leiberg* 2727, July 17, 1897; Lake Cœur d'Alene, *Henderson* 4607, August 8, 1898; Payette Lake, *Jones*, July 26, 1899.

WASHINGTON: *G. R. Vasey*, August, 1889; Rock Creek (near Mica Peak), Spokane County, *Suksdorf* 1199, June–July, 1889; high ridges of the Blue Mountains, Wallawalla County, *Piper* 2342, July 15, 1896.

EXPLANATION OF PLATE IV.—Fig. *a*, dorsal view of carpel; *b*, cross section of carpel.



LIGUSTICUM LEIBERGI C. & R., sp. nov.

This species was taken by us for *Angelica verticillata* Hooker and was so figured in Contributions U. S. National Herbarium, Vol. III, pl. 12. Prof. L. F. Henderson, who has collected extensively in the region from which the type specimens came, insists that material which he has collected is certainly typical. We have therefore somewhat reluctantly yielded to his claims.

9. **Ligusticum simulans** C. & R., sp. nov.

Glabrous except some slight roughness in the inflorescence; rather stout, 6 to 9 dm. high; leaves nearly all basal, varying greatly in size, ternate, then once or twice pinnate; segments narrowly oblong to ovate, variously toothed or lobed; umbel many-rayed, with involucels of linear bractlets; rays (fruiting) 2.5 to 7.5 cm. long; pedicels 6 to 10 mm. long; flowers white; fruit oblong, 4 to 5 mm. long, the ribs with narrow and very thin wings; stylopodium low conical.

Type locality, Lincoln Gulch, Wyoming; collected by *Aven Nelson*, no. 2626, August 13, 1896; type in U. S. Nat. Herb.

Mountains of Wyoming.

Specimens examined:

WYOMING: Laramie Peak, *Nelson* 1601, August 7, 1894; same station, Centennial Valley and Laplata Mines, *Nelson* 1665, 1677, 1784, August, 1895; Woods Creek and Lincoln Gulch (type specimens), *Nelson* 2086, 2626, August, 1896; Carbon County (Beaver Dam, Sierra Madre, and Battle Lake), *Nelson* 3389, 3402, 3410, 4175, August, 1897.

Easily confused with *Conioselinum scopulorum*.

10. **Ligusticum filicinum** Watson, Proc. Am. Acad. 11: 140. 1876.

Stem 4 to 9 dm. high, more or less leafy, with glabrous inflorescence; lower leaves often very large, once or twice ternate, then bipinnate; the segments or their pinnatifid divisions narrowly linear; umbel of numerous rays, with involucels of one or few small linear bractlets; rays (fruiting) 2.5 to 5 cm. long; pedicels 6 to 10 mm. long; fruit narrowly oblong, 6 to 7 mm. long, with somewhat prominent conical stylopodia, and prominent somewhat winged ribs; oil tubes 3 to 5 in the intervals, 6 to 8 on the commissural side.

Type locality, "Uinta Mountains," northern Utah, altitude 2,400 meters; collected by *Watson*, no. 454, August, 1869; type in Herb. Gray, duplicate in U. S. Nat. Herb.

Mountains of Utah, northwestern Wyoming, and western Montana.

Specimens examined:

UTAH: Type specimens as cited under type locality; Alta, Wasatch Mountains, altitude 2,700 meters, *Jones* 1170, August 4, 1879.

WYOMING: Wind River Mountains, *Forwood*, July 25, 1881; northwestern Wyoming, *Rose* 189, in 1893; Lewis River, Yellowstone Park, *A. & E. Nelson* 6591, August 21, 1899.

MONTANA: Lost Horse Pass, Bitter Root Forest Reserve, altitude 2,000 meters, *Leiberg* 2991, September 10, 1897.

11. **Ligusticum porteri** C. & R. Rev. N. Am. Umbell. 86. 1888.

Rather stout, 6 to 9 dm. high, leafy, with glabrous or puberulent inflorescence; leaves large, biternate then bipinnate; the numerous

rather crowded segments lanceolate to lanceolate-ovate, laciniately pinnatifid, toothed to entire, varying greatly in the degree and character of cutting, the lobes ranging from very narrow and sharp to broad and obtuse; umbel of numerous rays, mostly with neither involucre nor involucels; rays (fruiting) 2.5 to 5 cm. long; pedicels 6 to 8 mm. long; flowers white or pinkish; fruit oblong-ovate, 6 to 7 mm. long, with rather prominent winged ribs; stylopodium broad and low; oil tubes 4 to 6 in the intervals, 8 to 10 on the commissural side.

Type locality, "head waters of the Platte," near Denver, Colo.; collected by *J. M. Coulter*, June 25, 1873; type in Herb. Coulter.

In the Rocky Mountain region, from New Mexico and Arizona to Wyoming.

Specimens examined:

NEW MEXICO: *Rothrock*, in 1874; near Las Vegas, *G. R. Vasey*, in 1881; *Wolcott*, July 2, 1883; White Mountains, Lincoln County, altitude 2,700 meters, *Wooton* 549, August 16, 1897.

ARIZONA: Bill Williams Mountain, *Rusby* 630, June, 1883; Bill Williams Mountain, altitude 2,100 meters, *MacDougal* 324, July 22, 1898.

UTAH: Canyon above Kings Meadows, altitude 1,950 meters, *Ward* 222, June 16, 1875; southern Utah, *Palmer* 176, in 1877; Mount Ellen (Henry Mountains), altitude 3,000 meters, *Jones* 5680, July 25, 1894; Bromide Pass, altitude 3,000 meters, *Jones* 5695, August 27, 1894.

COLORADO: Type specimens as cited under type locality; Boulder, *Letterman*, July 20, 1885; mountains near Denver, *Hocham*, July, 1889; La Plata Mountains, *Alice Eastwood*, July 23, 1890; Delta County, altitude 2,100 meters, *Coven* 24, July 10, 1892; Red Cliff, altitude 2,400 meters, *Bethel*, July 2, 1894; Steamboat Springs, altitude 2,700 meters, *Crandall*, July 14, 1894; Telluride, altitude 3,240 to 3,300 meters, *Tweedy* 202, 203, August 25, 1894; Gore Mountains, altitude 2,850 meters, *Bethel*, August, 1895; Elk Canyon, altitude 2,250 meters, *Crandall*, August 8, 1897; La Plata Canyon, *Baker, Earle & Tracy* 546, July 12, 1898; Grand Mesa, *Bethel*, August, 1898; mountains near Pagosa Peak, altitude 2,700 to 3,600 meters, *Baker*, August 18, 1899.

WYOMING: Northwestern Wyoming, *Rose* 207, August 15, 1893; Moose Falls, Yellowstone Park, *A. & E. Nelson* 6580, August 21, 1899.

The variability of the foliage suggests a possible plexus, but our material does not permit segregation without field study.

12. **Ligusticum goldmani** C. & R. Proc. Wash. Acad. 1: 146. 1900.

Stems 5 to 8 dm. high, glabrous throughout, somewhat branching above; leaves *Conium*-like, thrice ternate then once to twice pinnate; ultimate segments ovate, small, entire or toothed, acute; peduncles more or less verticillate, 1 to 3 dm. long; rays very numerous, 3 to 8 cm. long; pedicels slender, 8 to 15 mm. long; involucre none; involucel none or of one or two bractlets; flowers white; fruit oblong, 7 to 8 mm. long; ribs with sharp thin wings; stylopodium as broad as high.

Type locality, "Chihuahua [Mexico]; Sierra Madre, 65 miles east of Batopilas;" collected by *E. A. Goldman*, no. 209, in 1898; type in U. S. Nat. Herb.

Mountains of Chihuahua, Mexico, and southern Arizona.

Specimens examined:

ARIZONA: Huahuaca Mountains, *C. G. Pringle*, July 8, 1884 (distributed as *L. filicinum* and afterwards referred to *L. porteri*).

13. **Ligusticum tenuifolium** Watson, Proc. Am. Acad. **14**: 293. 1879.

Stem slender, 3 to 6 dm. high, naked above the base or with a single leaf, bearing 1 to 3 glabrous umbels; leaves small, ternate, then pinnately decompound, finely dissected with laciniately divided leaflets, the ultimate segments narrowly linear to filiform; umbel few-rayed (6 to 12), with involucels of 1 or 2 narrowly linear bractlets; rays about 2.5 cm. long; pedicels 4 to 6 mm. long; fruit oblong, 3 to 4 mm. long, with narrow ribs; oil tubes 3 to 5 in the intervals, 6 to 8 on the commissural side.

Type locality, "mountains of Colorado;" collected by *Hall & Harbour*, no. 216 (in part); type in Herb. Gray. Associated with the type in the original description is "*Wolf & Rothrock* 721."

From the mountains of central Colorado to central Idaho and eastern Oregon.

Specimens examined:

COLORADO: Middle Park, *Parry*, in 1864; South Park, altitude 3,150 meters, *Wolf* 721, August, 1873.

IDAHO: Near Pettit Lake, Salmon River Valley, *Henderson* 3613, July 30, 1895; same station, altitude 2,145 meters, *Evermann* 388, August 16, 1895.

OREGON: Eagle Creek Mountains, altitude 1,500 to 2,100 meters, *Cusick* 1057, August, 1883; Union, Union County, altitude 1,500 to 2,400 meters, *Cusick* 1818, August, 1897.

14. **Ligusticum purpureum** C. & R., sp. nov.

Glabrous, except the puberulence at base of umbels and on rays; stems slender, 5 to 6 dm. high; leaves nearly all basal, once or twice ternate then pinnate; leaflets more or less distinct, ovate, and obtuse, 1 to 2.5 cm. long, serrate above and becoming more or less lobed below; umbel few-rayed, with involucels of few linear-lanceolate bractlets; rays 2 to 3 cm. long; pedicels 4 to 6 mm. long; flowers purple or purplish-tinged; fruit oblong, 4 mm. long, with ribs narrow but winglike; stylopodium low conical.

Type locality, Goat Mountains (Cascades), Washington, altitude 1,350 meters; collected by *Allen*, no. 259, September 25, 1896; type in U. S. Nat. Herb.

Cascade Mountains of Washington.

Specimens examined:

WASHINGTON: *Sandberg & Leiberg* 731*a*, in 1893; Mount Rainier, altitude 1,950 meters, *Piper* 2009, August, 1895; type specimens as cited under type locality.

15. **Ligusticum grayi** C. & R. Rev. N. Am. Umbell. 88. 1888.

Ligusticum apiifolium minus Gray, Bot. Calif. **1**: 264. 1876.

Stems 2 to 4 dm. high, with leaves small and all nearly basal, and glabrous inflorescence; leaves ternate then pinnate; the segments ovate, laciniately toothed; umbel of numerous rays, with involucels of sev-

eral narrowly linear elongated bractlets; rays 1 to 2 cm. long; pedicels 4 to 6 mm. long; fruit narrowly oblong, 3 to 5 mm. long, with short conical stylopodium, and narrow prominent almost winged ribs; oil tubes 3 to 5 in the intervals, 8 on the commissural side.

Type locality, "Ostrander's Meadows," Yosemite Valley, California; collected by *Bolander*, no. 6341, in 1866, altitude 2,400 meters; type in Herb. Gray, duplicate in U. S. Nat. Herb. Associated with the type in the original description is *Brewer* from Ebbetts Pass, Alpine County.

In the Sierra Nevada of California, from the Yosemite region to Siskiyou County.

Specimens examined:

CALIFORNIA: Type specimens as cited under type locality; Ebbetts Pass, Alpine County, altitude 2,550 meters, *Brewer* 2082, in 1863; Mount Stanford and Mount Shasta, *Hooker & Gray*, in 1877; Soda Springs, Nevada County, altitude 2,100 meters, *Jones* 2937, July 20, 1881.

16. **Ligusticum oreganum** C. & R., sp. nov.

Resembling *L. grayi*, but taller (reaching 6 dm.), and with larger leaves; leaf segments with sharper lobes; rays 2.5 to 5 cm. long; pedicels 4 to 8 mm. long; fruit with narrow wings and low thick stylopodium.

Type locality, Eagle Creek Mountains, Union County, Oreg.; collected by *Cusick*, no. 1058, August–September, 1884; type in U. S. Nat. Herb.

Only known from type locality.

17. **Ligusticum cusickii** C. & R., sp. nov.

Glabrous throughout; stems slender, 5 to 6 dm. high; leaves nearly all basal, once or twice ternate then pinnate; leaflets rather distant, ovate, obtuse, 1 to 2.5 cm. long, lacerate into linear or narrow divisions; umbel few-rayed, with involucels of a few linear-setaceous bractlets; rays about equal, 5 cm. long or more; pedicels 6 to 8 mm. long; fruit oblong, 4 mm. long, with narrow but wing-like ribs; stylopodium slender conical.

Type locality, higher mountains of eastern Oregon, altitude 1,800 to 2,400 meters; collected by *Cusick*, no. 1799, in 1897, and said to be very abundant; type in U. S. Nat. Herb.

From the mountains of northeastern California to those of eastern Oregon.

Specimens examined:

OREGON: Type specimens as cited under type locality; Warner Range, Lake County, altitude 1,800 meters, *Coville & Leiberg* 24, July 25, 1896.

CALIFORNIA: Sierra Valley, *Lemmon*, June, 1889.

18. **Ligusticum pringlei** C. & R., sp. nov.

Resembling *L. cusickii*, but stouter, somewhat taller and more branching, and with larger leaves; leaflets less distant, acute or obtuse,

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LIGUSTICUM EASTWOODEA C. & R.

irregularly toothed and lobed; rays 2.5 to 3.5 cm. long; fruit 4 to 5 mm. long, with conical stylopodium.

Type locality, along streams, Siskiyou County, Cal.; collected by *Pringle*, no. 19, August 28, 1882; type in Herb. Gray.

In the Sierra Nevada of eastern California, from the Yosemite to Siskiyou County.

Specimens examined:

CALIFORNIA: In addition to the type, the following specimens seem referable here: Near Donner Lake, *Torrey* 179, in 1865; Yosemite Valley, *Bolander* 4951, in 1866; Sierra County, *Lemmon*, June, 1883; Mariposa County, *Congdon*, August 13, 1895.

The above specimens from the Californian Sierras have been heretofore referred to *L. apiifolium*.

19. **Ligusticum macounii** C. & R. Contr. Nat. Herb. **1**: 289. pl. 23. 1893.

Low, acaulescent, 10 to 12.5 cm. high, glabrous; leaves pinnate, small, 12 to 20 mm. long, on petioles 12 to 30 mm. long; leaflets 5, oblong or oval, 3 to 5-lobed or cleft; umbel compact, with about 4 nearly equal rays, and conspicuous involucre and involucels of narrow bracts; flowers purple; rays 6 to 18 mm. long; pedicels about 2 mm. long; fruit broadly ovate, dark purple, 4 mm. long, with prominent ribs; oil tubes 2 or 3 in the intervals, 2 to 4 on the commissural side.

Type locality, "Cape Vancouver, Alaska;" collected by *J. M. Macoun*, August 9, 1891; type in U. S. Nat. Herb.

Alaska.

Specimens examined:

ALASKA: Type specimens as cited under type locality; Port Clarence and St. Matthew Island, *Coville & Kearney* 1938, 2136, July 12–15, 1899; Port Clarence and St. Matthews, *Trelease* 4540, 4541, 4542, July 12–15, 1899.

20. **Ligusticum eastwoodae** C. & R. Contr. Nat. Herb. **3**: 320. pl. 13. 1895. PLATE V.

Low, acaulescent, 10 to 30 cm. high, glabrous; leaves pinnate, 10 to 15 cm. long; leaflets 7 to 13, opposite, oval, 2 to 3-lobed, and lobes 2 to 3-cleft into linear acute segments; umbel few-rayed, compact, with involucre of 1 or 2 bracts or none, and conspicuous involucels of bractlets longer than the fruit; rays 4 to 6 mm. long; pedicels about 2 mm. long; fruit ovate, glabrous, 3 mm. long, with small ribs; stylopodium conical; oil tubes 2 or 3 in the intervals.

Type locality, "Cumberland Basin, La Plata Mountains, Colorado;" collected by *Alice Eastwood*, July–August, 1892; type in U. S. Nat. Herb.

An alpine species in the high mountains of southwestern Colorado.

Specimens examined:

COLORADO: Type specimens as cited under type locality; near Leadville, altitude 3,300 meters, *Bethel*, July 1, 1894; Telluride, altitude 3,900 meters, *Tweedy* 200, August 18, 1894; Bear Creek Divide, La Plata Mountains, altitude 3,300 meters, *Baker, Earle & Tracy* 215, June 29, 1898; mountains near Pagosa Peak, altitude 3,300 meters, *Baker*, August 28, 1899.

EXPLANATION OF PLATE V.—Fig. *a*, umbel; *b*, dorsal view of carpel; *c*, cross section of carpel.

The low acaulescent habit, simply pinnate leaves, and other characters of *L. eastwoodae* and *L. macounii*, so unlike our other species of *Ligusticum*, has suggested segregation as a genus. Species of similar habit, however, such as *L. aromaticum* Banks & Soland, and *L. enysii* Kirk, occur in New Zealand, and such segregation would demand an extended study of the whole genus.

In addition to the species described above, numerous specimens of *Ligusticum* have been collected which do not seem to belong to them, but the material is either too scanty or too incomplete for satisfactory determination. We cite some of this material in the hope that collectors may be able to supplement much of it.

A plant of the mountains of southeastern California, collected by *Purpus* (no. 5661) at "Farewell Gap," altitude 1,090 meters, in 1897, is not associated geographically with any known *Ligusticum*. It suggests *L. porteri* somewhat, which grows in northern Arizona, but it is acaulescent, with small fruit (4 to 5 mm.) and prominent conical stylopodium.

We can not determine *Kellogg & Harford* 304 and 309, June 24, 1868, from Oakland Hills, California. The plants are apparently different from either *L. apiodorum* or *L. californicum* of the same region.

Undetermined forms from the upper Rogue River region of southwestern Oregon are *Applegate* 2638 (Jackson County), July, 1898; and *Coville & Applegate* 1184 (Jefferson Mountain), August, 1898.

A form collected in flower near Montesano, Chehalis County, Wash., by *A. A. & E. Gertrude Heller* (no. 3973), June 28, 1898, has foliage quite different from any of the known species of *Ligusticum*.

In the Cascade Mountains of Washington, and especially in the region of Mount Rainier, there is a group of forms which have been confused with *L. apiifolium*, and which possibly represent several species. Some of them are as follows: *Suksdorf* 58 (Mount Adams), September, 1882; *Tweedy* 288, in 1882; Piper 629 (Mount Rainier), August, 1889; *Smith* 1050 (Mount Rainier), August, 1890; *Henderson* 378 (Mount Adams), August–October, 1892; *Gorman* 669 (head of Poison Creek), September, 1897; *Gorman* 816 (Horseshoe Basin), October, 1897; *Horner* 216, July 17, 1897; *Elmer* 1222 (Mount Stuart, Kittitas County), August, 1898.

Undetermined forms from northeastern Washington are the *Wilkes Exped.* plant from Fort Colville and Spokane River, and *Sandberg & Leiberg* 731, in 1893.

In Canby's Alaskan journey of 1897, plants were collected in the Selkirk Mountains at Glacier, Canada (no. 96), and in southern Alaska, which seem quite distinct from any known species of *Ligusticum*.

A *Ligusticum* from the Coast Mountains near Waldo, Oreg., collected by *Howell* (no. 121), June 13, 1884, seems to differ from any known species. It may possibly represent *Cynapium nudicaulis* Nutt. in Torr. & Gray Fl. **1**: 641. 1840, the description of which it seems to answer, but it is somewhat out of its range. The specimen has no basal leaves, so that no complete characterization is possible.

43. COELOPLEURUM Ledeb. Fl. Ross. **2**: 361. 1844.

Calyx teeth obsolete. Fruit oblong, slightly flattened laterally if at all, glabrous. Carpel with very thick and prominent corky ribs, becoming hollow, the laterals broadest or all equal, each with a large group of strengthening cells. Oil tubes small, 2 to 4 on the commissural side and 1 or 2 under each rib (in addition to the one in the interval), all adhering to the seed, which is loose in the pericarp, and with plane or somewhat concave face.

Stout glabrous seacoast perennials (puberulent in the inflorescence), with 2 to 3-ternate leaves on very large inflated petioles, few-leave deciduous involucre, involucels of numerous small linear-lanceolate bractlets (sometimes conspicuous or even like the leaves), and greenish-white flowers in many-rayed umbels.

Type species, *Archangelica gmelini* DC. Prod. **4**: 170. 1830.

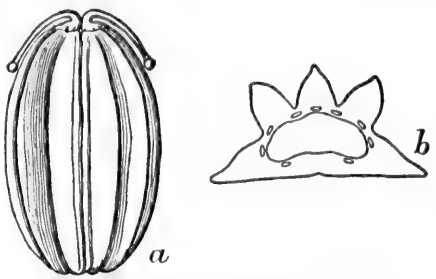


FIG. 44.—Coelopleurum longipes: *a*, ×6; *b*, ×8.

A genus of 4 or 5 species belonging to the northern coasts of North America and adjacent Asia.

Fruit with lateral ribs broader than the others; northwestern coast.
  Leaflets acute or acuminate.
    Fruit large, about 9 mm. long; Alaskan ..... 1. *C. gmelini.*
    Fruit smaller, 4 to 6 mm. long; Washington and northward ..... 2. *C. longipes.*
  Leaflets obtuse; Washington ..... 3. *C. maritimum.*
Fruit with equal ribs; northeastern coast ..... 4. *C. actaeifolium.*

1. **Coelopleurum gmelini** (DC.) Ledeb. Fl. Ross. **2**: 361. 1844.

Archangelica gmelini DC. Prodr. **4**: 170. 1830.

Densely puberulent in the inflorescence; inflated petioles very large, terminating above in two very obtuse lobes; leaflets thickish and strongly reticulate beneath, ovate (often broadly so), acute, with acute, obtuse, or cordate base, irregularly serrate or toothed, 3 to 6 cm. long, 2.5 to 5 cm. broad; rays 2.5 to 7.5 cm. long; pedicels 6 to 10 mm. long; bractlets numerous and very conspicuous, often much longer than the flowers, linear to lanceolate, and with a long acumination; fruit oblong, about 9 mm. long, the lateral ribs somewhat broader than the others (not so broad as in *C. maritimum*).

Type locality, "in Kamtschatka."

Alaska.

Specimens examined:

ALASKA: Unalaska, *Harrington*, in 1871–72; Nuohagak, *McKay*, in 1881; St. Paul Island, *J. M. Macoun*, July 28, 1891; same station, *Merriam*, August 7, 1891; Khantook Island, near Yakutat Bay, *Funston* 44, June 26, 1892; Dutch Harbor, Unalaska, *True & Prentiss* 136, 138, 139, 142, August 28–29, 1895; Point Gustavus (Glacier Bay), Kukak Bay, Unalaska, St. Mathew, Kadiak, and Foggy Bay, near Cape Fox, *Coville & Kearney* 720, 1628, 1719, 2090, 2284, 2558, June 10–July 27, 1899; Popof Island, *Kincaid*, July 8–19, 1899; Yakutat Bay, Kadiak, Unalaska, *Trelease* 4529, 4536, 4539, June 22–July 8, 1899.

The mature fruit supplied by the Harrington specimens collected by Coville & Kearney has enabled us to dissociate the Alaskan *C. gmelini* from the other American forms that have heretofore been confused with it.

In our previous Revision (p. 90) two doubtful plants were mentioned under this

species, viz: *Oakes* from "alpine region of the White Mountains," and *Watson* 459 from the Uinta Mountains. The former, referred at first to *Archangelica peregrina* and later to *A. gmelini*, proves to be *Angelica atropurpurea* L., while Watson's Uinta plant (distributed as *Archangelica gmelini*) is *Angelica roseana* Henderson.

2. **Coelopleurum longipes** C. & R., sp. nov. FIG. 44.

Leaflets ovate, acute to acuminate, usually narrowed and often cuneate at base, strongly veiny, sharply serrate or toothed, smaller than in *C. gmelini*; pedicels 12 to 16 mm. long; fruit oblong, 4 to 6 mm. long and 3 mm. broad, the lateral ribs slightly broader than the others.

Type locality, tide marshes near Astoria, Oregon; collected by *Joseph Howell*, no. 735, July 28, 1891; type in U. S. Nat. Herb.

Seacoast swamps, from the Columbia River to southern Alaska.

Specimens examined:

OREGON: Type specimens as cited under type locality.

WASHINGTON: Seattle, *Piper* 567, July 23, 1889; near Fairhaven, Whatcom County, *Suksdorf* 1200, July 13, 1890; along canal, near Hoodsport, Mason County, *Henderson*, August 15, 1890; seashore, Seattle, *Piper*, July, 1892; moist shores of Puget Sound, King County, *Henderson*, September, 1892.

BRITISH COLUMBIA: Drew Harbor, *Dawson*, July 1, 1888.

ALASKA: Shores of Short Bay, *Thos. Howell* 1628, July 14, 1895.

3. **Coelopleurum maritimum** C. & R. Bot. Gaz. **13**: 145. 1888.

Stems 6 to 9 dm. high; leaflets broad, often round, usually with cordate base, very obtuse, dentate or crenate-dentate, 6 to 7.5 cm. long, 6 cm. broad; rays 5 to 7.5 cm. long; pedicels 12 to 14 mm. long; fruit broadly oblong, 6 to 7 mm. long, 5 to 6 mm. broad, with lateral ribs more than twice as broad as the others.

Type locality, "wet ocean bluffs, Long Beach, Ilwaco [Pacific County], Wash.;" collected by *Henderson*, no. 384, July 24, 1886; type in Herb. Coulter.

Ocean bluffs near the mouth of the Columbia.

Specimens examined:

WASHINGTON: Type specimens as cited under type locality; same station, *Henderson*, September 7, 1892.

OREGON: Astoria, *Cooper*.

The Cooper specimens have smaller, thicker, and much more rugose leaves than the type, but the other characters seem to be identical.

4. **Coelopleurum actaeifolium** (Michx.) C. & R.

Ligusticum actaeifolium Michx. Fl. Bor. Am. **1**: 166. 1803, not of authors generally.

Resembling *C. gmelini*, but leaflets thinner, narrowed at base, more sharply serrate and toothed; rays 2.5 to 5 cm. long; bractlets less conspicuous; fruit oblong, 4 to 6 mm. long, with nearly equal ribs.

Type locality, "ad ripas fluminis S. Laurentii, juxta Tadousack," Quebec; collected by *Michaux*.

From Massachusetts Bay to Labrador, and along the Lower St. Lawrence.

Specimens examined:

MASSACHUSETTS: On an island near Beverly, *Torrey;* Beverly Bay (no collector given), August, 1847.

MAINE: Cape Elizabeth, *Boott*, July 18, 1861; shores of Seal Harbor, Mount Desert, *Redfield*, August 1, 1890.

NEW BRUNSWICK: St. Anne, *Allen*, August 16, 1881; coast of Gaspé, *Macoun* 87, August 1, 1882.

NOVA SCOTIA: Ingonish, Cape Breton Island, *Macoun* 19120, August 3, 1898.

LABRADOR: Dumpling Harbor, *Mann*, July 17, 1864; shore of Esquimaux River, *Allen* 48, July 27, 1882.

This *Coelopleurum* is abundant in the region of the type locality of Michaux's *Ligusticum actaeifolium*, associated with *L. scothicum* L., which Michaux collected at the same station. Such a plant could hardly have escaped him, and he would naturally associate it with *L. scothicum*. Besides, it is the only plant of the region which agrees with the original description of *L. actaeifolium*. Therefore, while we have not seen the type specimen, we feel justified in identifying Michaux's plant as our *Coelopleurum* of the northeast coast, heretofore referred to the Alaskan *C. gmelini*.

A form from the "rocky shore of the St. Lawrence, Temiscouata, Canada," collected by *Pringle*, August 28, 1879, and represented only by a cluster of mature fruits, may possibly be *C. actaeifolium*, as the fruit has uniform ribs, but it is much larger, being 10 to 12 mm. long. It was mentioned in our Revision of 1888, but no new specimens have been received.

44. OREOXIS Raf. Ser. Bull. Bot. 217. 1830.

Calyx teeth prominent. Fruit globose, slightly flattened laterally if at all, glabrous or puberulent. Carpel with very thick and prominent equal corky ribs, each with a large group of strengthening cells. Carpophore none. Stylopodium wanting. Oil tubes 1 to 3 in the very narrow intervals, 2 on the commissural side, and a small one in each dorsal rib. Seed sulcate beneath the oil tubes, with flat or somewhat concave face.

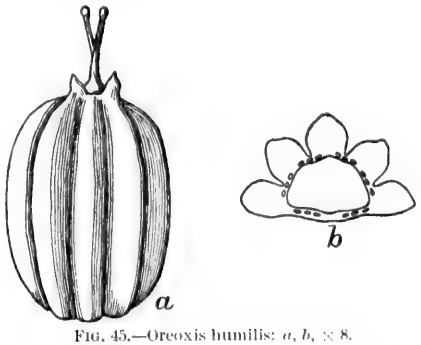


FIG. 45.—Oreoxis humilis: *a*, *b*, × 8.

Alpine cespitose perennials, with pinnate leaves usually shorter than the peduncles, no involucre, and involucels of narrow bractlets equaling the yellow flowers.

Type species, *Oreoxis humilis* Raf.

A genus of at least 2 species, belonging to the high mountains of Colorado and Utah, and probably New Mexico and Arizona.

Glabrous, except perhaps in the umbel; oil tubes more than one in the intervals.
- Involucels linear ..... 1. *O. humilis.*
- Involucels conspicuous and toothed ..... 2. *O. bakeri.*

Puberulent; oil tubes solitary in the intervals ..... 3. *O. alpina.*

1. **Oreoxis humilis** Raf. Ser. Bull. Bot. 217. 1830. FIG. 45.

Glabrous (sometimes slightly puberulent just below umbel), cespi-

tose, from a somewhat slender elongated root; leaves pinnate, the leaflets cut into 3 to 7 linear-lanceolate segments; peduncles 2 to 7.5 cm. high; umbels few-rayed, with involucels of linear distinct bractlets; flowers bright yellow; fruit 3 to 4 mm. long; oil tubes 2 or 3 (rarely 1) in the intervals.

Type locality, "Rocky Mountains;" collected by *James*, no. 179, in 1820; type in Herb. Columbia Univ.

Summits of high mountains, Colorado, chiefly in the region of Pikes Peak.

Specimens examined:

COLORADO: Pikes Peak, altitude 3,900 meters, *Letterman* 223, August 13, 1884; same station, altitude 4,200 meters, *Sheldon* 311, August 28, 1884; same station, *Alice Eastwood*, July, 1892; same station, *Canby*, August 27, 1895; same station, altitude 3,600 to 4,200 meters, *Holzinger* 9, June 7, 1896; same station, *Knowlton* 20, June 14, 1896; Bear Creek Divide west of Mount Hesperus, altitude 3,300 meters, *Baker* 228, June 29, 1898.

2. **Oreoxis bakeri** C. & R., sp. nov. FIG. 46.

Glabrous throughout except some puberulence at the top of peduncle and on rays, cespitose, from thickish elongated roots; leaflets opposite, 3 to 5 pairs, somewhat distant, 3 to 5-cleft into linear or linear-lanceolate entire lobes; peduncles longer than the leaves, 3 to 8 cm. long, erect, or more or less inclined; flowering umbel very compact, almost head-like; fruiting rays nearly equal, 3 to 5 mm. long; pedicels 2 mm. or less long; involucel of numerous distinct obovate bractlets strongly 3-toothed at apex; fruit 3 to 4 mm. long, usually purplish; oil tubes 2 or 5 in the intervals.

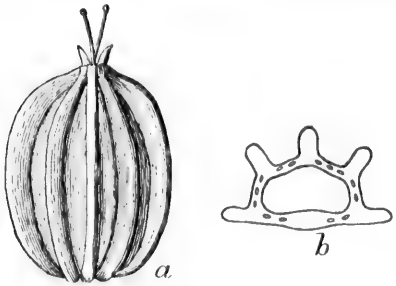


FIG. 46.—Oreoxis bakeri: *a*, *b*, × 8.

Type locality, mountains near Pagosa Peak, Colorado.

High mountains of Colorado.

Specimens examined:

COLORADO: Mount Hayden, altitude 3,900 meters, *Baker, Earle & Tracy* 577, July 14, 1898; mountains near Pagosa Peak, altitude 3,600 meters, *C. F. Baker* 12, August 23, 1899.

3. **Oreoxis alpina** (Gray) C. &. R.

Cymopterus alpinus Gray, Am. Jour. Sci. II. **33**: 408. 1862.

Puberulent (rarely glabrous), with paler more dissected leaves and shorter more crowded leaflets; involucels of somewhat broader bractlets more or less united at base; flowers paler; fruit 4 to 5 mm. long, puberulent (at least when young); oil tubes solitary in the intervals.

Type locality, "on high alpine ridges," Colorado; collected by *Parry* in 1861; type in Herb. Gray.

High mountains of Colorado and extending into Utah.

Specimens examined:

COLORADO: *Wolf* 731, in 1873; type specimens as cited under type locality; Grays Peak, altitude 3,300 to 4,200 meters, *Patterson* 39 (small form), August, 1885; same station, altitude 3,900 meters, *Crandall*, July 18, 1892; Flat Top Mountains, altitude 2,700 meters, and Leadville Mountains, altitude 3,300 meters, *Bethel*, July, 1894; Cameron Pass, altitude 3,600 meters, *Crandall* 27, July 5, 1894; near Leadville, *Osterhout*, June, 1895; mountains above Boreas, altitude 3,600 meters, *Coues* 186, August 2, 1895; near Veta Pass, *Rydberg*, June 20, 1900.

UTAH: Mount Ellen, Henry Mountains, altitude 3,300 meters, *Jones* 5669, July 25, 1894; Bromide Pass, Henry Mountains, altitude 3,000 meters, *Jones* 5695, July 27, 1894; near Fish Lake, altitude 2,700 meters, *Jones* 5826, August 11, 1894.

We have seen no specimens of this from Pikes Peak, where *O. humilis* especially abounds, but it extends over the western mountains and into Utah.

We have excluded certain larger forms, with very different foliage, which have been distributed as *O. humilis* (*Cymopterus alpinus*). In the absence of fruit their relationship can not be determined. If they belong to *Oreoxis* the genus certainly contains one or two additional species and has a more extended range. The excluded sheets are as follows: Arizona, *Palmer* 40, in 1869; Fort Wingate, N. Mex., *Marsh* 22, May 25, 1883; Grays Peak, *Patterson* 39 (large form), August, 1885.

45. **THASPIUM** Nutt. Gen. 1: 196. 1818.

Calyx teeth conspicuous. Fruit ovoid to oblong, slightly flattened dorsally if at all, mostly glabrous. Carpel with 3 or 4 or all the ribs strongly winged. Stylopodium wanting; styles long. Oil tubes solitary in the intervals, 2 on the commissural side. Seed sulcate beneath the oil tubes, almost terete or somewhat dorsally flattened, with plane face.

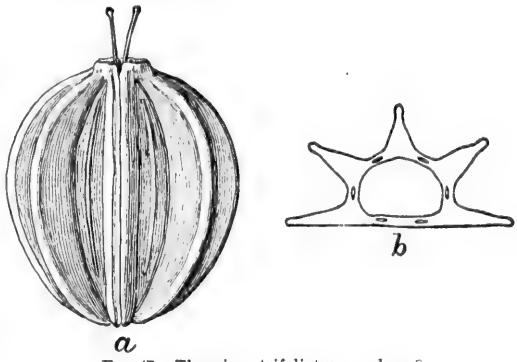


FIG. 47.—Thaspium trifoliatum: *a*, *b*, × 8.

Perennials (6 to 15 dm. high), with ternately compound leaves (divisions sometimes pinnate) and broad serrate or toothed leaflets (or lower leaves simple), mostly no involucre, involucels of small bractlets, mostly yellow flowers, and all the fruits pedicelled.

First species cited, *Thaspium aureum* Nutt.

A genus of 3 species belonging to eastern North America.

Basal leaves simple or once ternate..... 1. *T. trifoliatum.*
Basal leaves twice or more ternate or pinnate.
Leaflets ovate, serrate to lanceolate..... 2. *T. barbinode.*
Leaflets pinnately cut into linear or oblong lobes..... 3. *T. pinnatifidum.*

1. **Thaspium trifoliatum** (L.) Gray, Man. ed. 2. 156. 1856 (as to name). FIG. 47.

Thapsia trifoliata L. Sp. Pl. **1**: 262. 1753.
Smyrnium atropurpureum Desr. in Lam. Encyl. **3**: 667. 1789.
Thaspium atropurpureum Nutt. Gen. **1**: 196. 1818.
Thaspium trifoliatum atropurpureum Torr. & Gray in Gray's Man. ed. 2. 156. 1856.
Thaspium aureum atropurpureum C. & R. Bot. Gaz. **12**: 136. 1887.

Glabrous; basal leaves mostly cordate, serrate; stem leaves simply ternate (rarely biternate); leaflets ovate to lanceolate, rounded or tapering at base, serrate; umbels 8 to 12-rayed; rays 1 to 2.5 cm. long; pedicels about 2 mm. long; flowers dark purple; fruit globose-ovoid, about 4 mm. long, all the ribs equally winged.

Type locality, "Virginia."

Rhode Island to North Carolina, west to Tennessee and Illinois.

Specimens examined:

PENNSYLVANIA: Delaware County.

NORTH CAROLINA: Melrose, Polk County, *Townsend*, May 17, 1897; near Biltmore, *Bilt. Herb.* 1391*b*, May 26, 1897.

TENNESSEE: Tazewell, *Tidcott*, May, 1889; Knox County, *Kearney*, May 21, 1891; Cocke County, *Kearney*, May, 1893; Post Oak Springs, Roane County, *Pollard & Maxon* 415, August 6, 1900.

KENTUCKY: Bell County, *Kearney* 510, September, 1893; Harlan County, *Kearney* 241, August, 1893.

Thaspium trifoliatum aureum (Nutt.) Britton, Mem. Torr. Club **5**: 240. 1894.

Thaspium aureum Nutt. Gen. **1**: 196. 1818.
Thaspium aureum trifoliatum C. & R. Bot. Gaz. **12**: 136. 1887.

Flowers yellow.

Type locality not given.

From New England to Georgia, and westward to Arkansas, Wyoming, and Oregon (?).

Specimens examined:

MARYLAND: High Island, in the Potomac, *Kearney*, May, 1896.

NORTH CAROLINA: Linville, *Kelsey*, September, 1890.

SOUTH CAROLINA: Aiken, *Ravenel*.

TENNESSEE: Cocke County, *Kearney* 704, September 2, 1897; near Knoxville, *Ruth* 428, June, 1898.

ALABAMA: *Winchell*.

MISSISSIPPI: Starkville, *Phares*, May, 1886.

ARKANSAS: Salado Creek, *Coville* 179, July 30, 1887.

WEST VIRGINIA: Upshur County, *Pollock*, May, 1895.

KENTUCKY: Lexington, *Garman*, May 21, 1892.

OHIO: Niles, *Ingraham*, May–July, 1891.

INDIANA: Delphi, Carroll County, *Rose*, July, 1892.

ILLINOIS: Near Chicago, *Babcock*.

MISSOURI: Wright and Shannon counties, *Bush*, June, 1884, 1888, 1890; *Tracy*, June 21, 1885; Jefferson County, *Hasse*, June, 1887; Jackson County, *Mackenzie*, June 6, 1897; Eagle Rock, *Bush* 209, June 26, 1897.

WYOMING: La Barge, *Stevenson* 23, June, 1894.

Thaspium barbinode (Michx.) Nutt. Gen. Pl. **1**: 196. 1818.

Ligusticum (?) *barbinode* Michx. Fl. Bor. Am. **1**: 167. 1803.
Smyrnium barbinode Muhl. Cat. 31. 1813.

Loosely branched, pubescent on the joints, sometimes puberulent in the umbels; leaves 1 to 3-ternate; leaflets ovate to lanceolate, acute, with cuneate base, coarsely toothed or cut serrate, often ternately cleft or parted; flowers light yellow; fruit broadly oblong, glabrous or minutely roughened, about 6 mm. long and 4 mm. broad, with mostly 7 ribs prominently winged, the other three not at all winged or but slightly so.

Type locality, "in Carolina superiore."

From New York to North Carolina and Alabama, west to Minnesota and Arkansas.

Specimens examined:

New York: Waverly, *Coville*, June 4, 1887.

Pennsylvania: Near Lancaster, *Small*, May 14, 1891.

Maryland: Near Baltimore, *Foreman*, in 1873.

District of Columbia: *Vasey*, in 1873; *Ward*, in 1878; *Sudworth*, in 1889; Zoological Park, *Pollard* 380, June 15, 1895.

Virginia: Salt Pond Mountain, *Canby*, August, 1890; Arlington, *Blanchard*, June 28, 1891; Mount Rogers, Augusta County, *A. A. & E. Gertrude Heller* 1182, August 9, 1893.

North Carolina: Mountains, *G. R. Vasey*, in 1878; Swain County, *Beardslee* 28, August 10, 1891; Roan Mountain, *Merriam*, August 8, 1892; Biltmore, *Bilt. Herb.* 1036, May–August, 1896; Polk County, *Townsend*, June 17, 1897.

Alabama: Huntsville, Madison County, *Pollard & Maxon* 365, August 1, 1900.

West Virginia: Carroll County, *Small*, June 12, 1892; Pocahontas County and Taylor County, *Pollock*, June, 1896 and 1897.

Tennessee: Knox County, *Kearney*, May 9, 1891; Cocke County, *Kearney* 703, September 8, 1897; near Knoxville, *Ruth* 427, July, 1898.

Kentucky: Elk Lick Falls and Clay's Ferry, Kentucky River, *Garman*, August, 1892.

Illinois: Southern Illinois, *French;* near Oquawka, *Patterson.*

Missouri: Wright County, *Bush*, in 1884; Stone County, *Blankinship*, in 1887; Eagle Rock, *Bush* 205, June 6, 1897.

Arkansas: Decatur, *Plank.*

The foliage is excessively variable. In the ordinary forms the leaves are strictly ternate throughout and coarsely toothed. The variations are in the direction of leaves being cut almost into a fringe of linear or oblong lobes, and their secondary divisions becoming distinctly pinnate. The following varieties are but extreme forms, connected with the specific type by numerous intergrades.

Thaspium barbinode angustifolium C. & R. Bot. Gaz. **12**: 137. 1887.

Leaflets smaller, narrower, and more sharply cut; fruit more or less puberulent.

Type locality, near Crawfordsville, Ind.; collected by *J. N. Rose*, June, 1887; type in Herb. Coulter.

Pennsylvania to Illinois.

Specimens examined:

Indiana: Type specimens as cited under type locality; same station, *Rose*, June 22, 1892.

Illinois: Homer, Champaign County, *Uline*, June, 1891.

Thaspium barbinode chapmani C. & R.

Thaspium barbinode pinnatifidum C. & R. Rev. N. Am. Umbell. 84. 1888. Not Buckl.

Divisions of the 1 to 3-ternate leaves inclined to be pinnate; leaflet small, more or less laciniate-lobed, with rather obtuse lobes; fruit puberulent.

Type locality, calcareous bluffs, Jackson County, northwest "Florida;" collected by *Curtiss*, no. 1023; type in U. S. Nat. Herb.

Northwest Florida and possibly adjacent Georgia.

Specimens examined:

FLORIDA: Type specimens as cited under type locality.

Specimens collected by *Erwin F. Smith* on dry hills, Griffin, Spalding County, Ga., July 7, 1890, may possibly be this form, but lack of foliage prevents certain determination. The plants are very much stouter, and the dorsal wings are nearly equal.

Thaspium barbinode garmani C. & R., var. nov.

Low and rather slender; stem smooth, about 5 dm. high; basal leaves several and long-petioled, 1 to 2-ternate, then pinnate; very pubescent at joints and on veins beneath; leaflets ovate, small (1 to 5 mm.), sharply and finely serrate, usually somewhat lobed.

Type locality, cliffs of Kentucky River near Lexington; collected by *Garman & Rose*, August 15, 1895; type in U. S. Nat. Herb.

Only known from the type locality.

3. **Thaspium pinnatifidum** (Buckl.) Gray, Man. ed. 2. 155. 1856.

Zizia pinnatifida Buckl. Am. Jour. Sci. **45**: 175. 1843.
Thaspium walteri Shuttlw. in Pl. Wright. **1**: 79. 1852.

Slender plant with dissected leaves, puberulent on branchlets, umbels, and fruit, and with fewer leaves; leaves 1 to 3-ternate; leaflets 1 to 2-pinnatifid, lobes linear or oblong; one or two leaves near the base often very large and long-petioled (petioles sometimes 3 dm. long); flowers light yellow; fruit oblong, 3 to 4 mm. long, 2 to 3 mm. broad; all the ribs narrowly winged.

Type locality, "banks of the French Broad River near the Warm Springs, and near Sugar Town Falls, Macon County, N. C.;" collected by *Buckley;* type in Herb. Gray.

Western North Carolina and extending into Tennessee and Kentucky.

Specimens examined:

NORTH CAROLINA: Type specimens as cited under type locality; Macon County, *Rugel*, September, 1842 (type of *T. walteri* Shuttlw.); Swain County, *Beardslee & Kofoid* 23, August 10, 1891.

TENNESSEE: Davidson County, *Gattinger*.

In our previous Revision plants collected by Short in the "barrens of Kentucky" in 1842 were referred to this species. There are on the sheet fragments of four plants, one of which is true *T. barbinode*, and the other three are different, but may or may not be the same species. None of them are *T. pinnatifidum*, and collectors should look for these forms in Short's region.

46. CONIOSELINUM Hoffm. Gen. Umb. xxviii and 180. 1814.

Calyx teeth obsolete. Fruit oblong, dorsally flattened, glabrous. Carpel with prominent dorsal and intermediate ribs (sometimes narrowly winged), and the laterals broadly winged and thickish. Stylopodium slightly conical. Oil tubes usually solitary in the dorsal intervals, 1 to several in the lateral, 2 to 8 on the commissural side. Seed with plane or slightly concave face.

Glabrous perennials (or inflorescence sometimes puberulent), with ternate then pinnately decompound leaves, ovate acute laciniately toothed or lobed leaflets, involucre more or less conspicuous or none, involucels of numerous more or less elongated narrow bractlets, and white flowers.

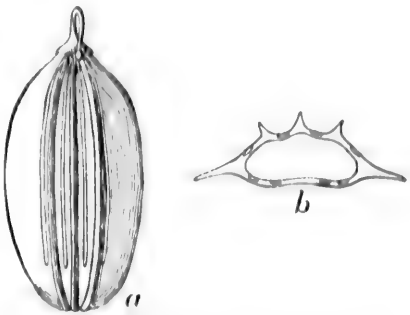


FIG. 48.—Coniselinum gmelini: *a*, × 6; *b*, × 8.

The genus was described in 1814 by Hoffman, but redescribed in 1816 with *Coniselinum tataricum* Hoffm. (Gen. Umb. ed. 2. 185. 1816) as the type.

A genus of 9 species, belonging to the boreal and north temperate regions of both hemispheres, 5 of which are North American.

In retaining this genus Drude recognizes 5 species (*C. canadense* Torr. & Gray, *C. kamtschaticum* Rupr., *C. latifolium* Rupr., *C. tataricum* Hoffm., and *C. univittatum* Turcz.). We add herewith 4 species, 3 of which we had heretofore referred to *Selinum* and one to *Ligusticum*. As thus organized the genus is a very natural one, of remarkably uniform habit. Its dorsally flattened fruit, with winged lateral ribs, and merely ribbed or less broadly winged dorsals and intermediates associate it in the alliance with *Angelica*, and quite apart from *Selinum* and *Ligusticum*, in which the fruit is laterally flattened and equally ribbed or winged.

We exclude *Selinum* from our flora more through inference than from any definite knowledge of that genus. The type species is *S. sylvestre* L. Sp. Pl. 1 : 244. 1753, and, aside from meager descriptions, we have seen only the plate of it published in *Flora Danica*. All the testimony we have indicates that it has a laterally flattened fruit, as Drude states, and is in the *Ligusticum* alliance.

Involucels not scarious.
Bractlets linear and mostly entire.
Leaflets finely dissected.
Bractlets inconspicuous; northeastern ..... 1. *C. chinense.*
Bractlets conspicuous; northwestern ..... 2. *C. gmelini.*
Leaflets more coarsely lobed; Rocky Mountains ..... 3. *C. scopulorum.*
Bractlets usually spatulate-linear and more or less toothed or lobed; Californian. 4. *C. pacificum.*
Involucels scarious ..... 5. *C. dawsoni.*

1. **Conioselinum chinense** (L.) B. S. P. Prel. Cat. N. Y. 22. 1888.

Athamanta chinensis L. Sp. Pl. **1**: 245. 1753.
Selinum canadense Michx. Fl. Bor. Am. **1**: 165. 1803.
Conioselinum canadense Torr. & Gray, Fl. **1**: 619. 1840.
Conioselinum bipinnatum Britton, Bull. Torr. Bot. Club **14**: 233. 1887.

Erect, 3 to 15 dm. high; glabrous, except the somewhat puberulent inflorescence; leaves often very large; leaflets 2.5 cm. long or more, laciniately lobed; umbel 10 to 20-rayed; rays about 2.5 cm. long; pedicels 6 to 8 mm. long; fruit 4 to 5 mm. long; oil tubes 2 or 3 in the intervals (sometimes 1 in a dorsal or 4 in a lateral interval), 4 to 8 on the commissural side.

Type locality, probably Virginia; collected by *Bartram*.

From Labrador to the mountains of North Carolina, westward to central Indiana and Minnesota.

Specimens examined:

LABRADOR: Bonne Esperance, *Allen*, August 27, 1882.
NEWFOUNDLAND: Exploits River, *Robinson & Schrenk*, August 13, 1894.
NEW BRUNSWICK: St. Johns, *Boott*, August 18, 1873; Gaspé, *Macoun* 86, August 27, 1882.
QUEBEC: Mouth of the Saguenay River, *Goodale*, in 1870.
ONTARIO: Near London, *Burgess*, August 20, 1880.
MAINE: Rumford, Oxford County, *Parlin*, in 1889; Mount Desert, *Redfield*, August 6, 1890; Aroostook County, *Fernald* 49, July 25, 1893.
NEW HAMPSHIRE: Strafford County, *Boott*, September 14, 1855.
VERMONT: Fairhaven, *Eggleston*, September 12, 1897.
MASSACHUSETTS: Plymouth, *Oakes*.
NEW YORK: Oneida, *Knieskern;* Yates County, *Wright;* Ithaca, *Dudley* 60, September 13, 1875.
PENNSYLVANIA: Huntingdon County, *Porter*.
NEW JERSEY: Sussex County, *Van Sickle*, August 12, 1894.
NORTH CAROLINA: Grandfather Mountains, *Gray & Carey*, July, 1841.
INDIANA: Montgomery and Carroll counties, *Rose*, June–July, 1892.
MICHIGAN: Washtenaw County, *Boott;* Ingham County, *Wheeler*, September 15, 1891.
WISCONSIN: Near Milwaukee, *Lapham*, in 1846; Williams Bay, *Umbach*, August 20, 1897.

2. **Conioselinum gmelini** (Cham. & Schlecht.) C. & R. FIG. 48.

Ligusticum gmelini Cham. & Schlecht. Linnaea **1**: 391. 1826.
Selinum benthami Wats. Bibl. Index 432. 1878.
Selinum hookeri Watson in C. & R. Rev. N. Am. Umbell. 45. 1888.
Formerly named *C. fischeri* by American authors.

Stout, 6 to 9 dm. high, glabrous except the sometimes puberulent inflorescence; leaves large, the narrowly ovate to linear-oblong acute segments 1 to 2.5 cm. long, laciniately toothed or lobed to entire; umbel 10 to 25-rayed, with involucre of a few linear-setaceous bracts, and involucels of setaceous or linear bractlets shorter or longer than the flowers, sometimes much longer and cleft; rays about 2.5 cm. long; pedicels 4 to 6 mm. long; fruit ovate or oblong, 4 to 5 mm. long, with

prominent but scarcely winged dorsal and intermediate ribs and rather broadly winged laterals.

Type locality, "Unalaska."

From Alaska and Northwest Territory southward to Washington and the Columbia River.

Specimens examined:

ALASKA: Sitka, *Kellogg* 107, in 1867; Nuohagak, *McKay*, July 27, 1881; Chilcat, *Grace E. Cooley*, August 9, 1891; Otter Island, *J. M. Macoun*, August 29, 1891; Unalaska and St. George islands, *Eremann* 48, 90, July 9–31, 1892; Cape Phipps, Yakutat Bay, *Funston* 73, July 23, 1892; Adakh, St. Paul, and Akun islands, *Townsend*, July–August, 1893; St. George, St. Paul, and Unalaska islands, *True & Prentiss* 59, 77, 108, 110, 131, 135, 141, August 6–29, 1895; Yes Bay, *Howell* 1627, August 6, 1895; same station, *Gorman* 153, August 17, 1895; St. Paul Island, *J. M. Macoun*, August 5, 1896; Bering Sea, *McConn*, in 1897; Fort Wrangell, *Canby* 95, August 28, 1897; Haenke and Kadiak islands, *Coville & Kearney* 1090, 2258, 2298, June 22–July 20, 1899; Popof and Shumagin islands, *Saunders*, July 7–18, 1899; Kadlak Island, *Trelease* 4535, July 19, 1899; Juneau, *Brewer & Coe* 582, July 25, 1899.

BRITISH COLUMBIA: Barclay Sound, Vancouver Island, *Macoun*, August 8, 1887.

WASHINGTON: Puget Sound, *Wilkes Exped.* 7; Seattle, *Piper* 631, September, 1888 and 1890; Mason County, *Piper*, July 23, 1890; near Ilwaco, Pacific County, *Henderson* 2160, September 7, 1892.

OREGON: In tide marshes near Astoria, *Howell* 736, July 28, 1891.

We find it impossible to separate the two forms heretofore known as *Selinum benthami* and *S. hookeri*.

3. **Conioselinum scopulorum** (Gray) C. & R.

Ligusticum scopulorum Gray, Proc. Am. Acad. **7**: 347. 1868.

Nearly simple, 6 to 9 dm. high, more or less leafy, with puberulent inflorescence; lower leaves often very large, twice to thrice ternate then once or twice pinnate; leaflets (sometimes small) laciniately pinnatifid; upper leaves often ternate-pinnate or simply pinnately compound; umbel of numerous rays, with involucels of several narrowly linear elongated bractlets; rays (fruiting) 5 to 7.5 cm. long; pedicels 12 mm. long; fruit about 6 mm. long; oil tubes usually 1 in the dorsal intervals and 2 in the lateral, 2 to 4 on the commissural side.

Type locality, "Santa Antonita, New Mexico;" collected by *Bigelow;* type in Herb. Gray, duplicate in U. S. Nat. Herb. Associated with the type in the original description are *Parry* 156, and *Hall & Harbour* 216 (in part), both from the mountains of Colorado. The *Suckley* Washington plant referred to is *C. gmelini*.

A species of the Rocky Mountain region, extending from Arizona and New Mexico through Colorado and Utah to eastern Oregon.

Specimens examined:

ARIZONA: Rucker Valley, *Lemmon* 393, in 1881; Fort Huachuca, *Wilcox* 486, September, 1894; Chirricahua Mountains, *Toumey*, in 1897.

NEW MEXICO: Type specimen as cited under type locality; Mogollon Mountains, *Rusby* 147a, September 7, 1881; Cluska Mountains, *Walcott* 150, July 2, 1883.

COLORADO: Clear Creek, *Parry* 156, in 1861; *Hall & Harbour* 216, in 1862; *Vasey* 224, in 1868; Twin Lakes, altitude 3,300 meters, *Wolf* 714, August, 1873; *Parry*, in 1874; Pikes Peak, altitude 2,700 meters, *Letterman* 219, August 13, 1884; near Empire, *Patterson* 212, August–September, 1892; Telluride, altitude 3,150 meters, *Tweedy* 205, August 25, 1894; Stove Prairie, *Crandall*, August 20, 1895; canyon near Palmer Lake, Marshall Pass, and near Breckenridge, altitude 2,200 to 3,600 meters, *Crandall*, August 12–27, 1896; Cameron Pass, altitude 2,850 meters, *Baker*, July 29, 1896; Tennessee Pass, *Jepson*, August, 1896; Buena Vista, altitude 2,400 meters, *Crandall*, August 19, 1897.

OREGON: Streams near Snake River, *Cusick* 1391, in 1886; banks of Wallowa River, *Cusick* 2090, August 22, 1898.

4. **Conioselinum pacificum** (Watson) C. & R.

Selinum pacificum Watson, Proc. Am. Acad. **11**: 140. 1876.

Stout, 3 to 6 dm. high; leaflets 2.5 cm. long, laciniately toothed and lobed; umbel (on stout peduncle) about 15-rayed, with a conspicuous involucre of 2 or 3-lobed and toothed leaflets 2.5 cm. long and equaling the rays, and involucels of several narrowly linear or spatulate-linear bractlets, entire or 3 to 5-toothed or laciniately lobed above, equaling or exceeding the flowers; pedicels 4 to 8 mm. long; fruit oblong, 6 to 8 mm. long, 3 mm. broad, with rather narrow thin wings; oil tubes solitary in the intervals or a small additional one in a lateral interval.

Type locality, "on the Saucelito hills, near San Francisco," Cal.; collected by *Kellogg & Harford*, no. 315, in 1868–69; type in Herb. Gray, duplicate in U. S. Nat. Herb.

Only known from the type locality.

Specimens examined:

CALIFORNIA: Type specimens as cited under type locality.

This is a very rare species and seems to be extinct at the type locality. At least, Miss Alice Eastwood has examined for several years past all the hills about Sausalito and San Francisco without finding it. A specimen of this species is in herbarium of the California Academy of Science and is said to have been collected at Long Valley, Mendocino County, by A. Kellogg. The label, however, is not an original one, and Californian collectors are urged to keep this plant in mind.

5. **Conioselinum dawsoni** C. & R.

Selinum dawsoni C. & R. Bot. Gaz. **13**: 144. 1888.

Stout, 6 to 9 dm. high, glabrous; leaflets small, 6 to 12 mm. long, laciniately toothed to entire; involucels of linear-oblong scarious bractlets longer than the pedicels and abruptly ending in a long attenuation; pedicels 2 to 4 mm. long; fruit oblong, about 4 mm. long, with prominent wings, the lateral ones but little broader; oil tubes solitary in the intervals or a small one in a lateral interval.

Type locality, "Pelly River, at Pelly Banks, Yukon, lat. 61°;" collected by *Dawson*, no. 23, August 11, 1887; type in Herb. Coulter.

Alaska, Yukon, and Mackenzie.

Specimens examined:

ALASKA: Type specimens as cited under type locality; *Funston* 131, in 1893.
YUKON: Dawson City, *R. S. Williams*, August 6, 1899.
MACKENZIE: Fort Good Hope, *Miss E. Taylor*, July 11, 1892.

47. ANGELICA L. Sp. Pl. 1: 250. 1753.

Archangelica Hoffm. Gen. Umb. 161. 1814.

Calyx teeth mostly obsolete. Fruit flattened dorsally, ovate or oblong, glabrous or pubescent, with prominent crenulate disk. Carpel with strong ribs, each with a group of strengthening cells; laterals usually broadly winged, distinct from those of the other carpel, forming a double-winged margin to the fruit. Stylopodium conical. Oil tubes 1 to several in the intervals or indefinite, 2 to 10 on the commissural side. Seed face plane or somewhat concave.

Stout perennials, with ternate-pinnately (rarely simply pinnate) compound leaves, scanty involucre or none, involucels of small bractlets or none, and large terminal umbels of white flowers (greenish-yellow or purplish in two or three species).

First species cited, *Angelica archangelica* L., which is *Archangelica officinalis*, the type of Hoffmann's *Archangelica*.

A genus of about 35 species, belonging to the Northern Hemisphere (North America, Europe, and western Asia) and New Zealand, 18 species occurring in the United States and Canada.

OIL TUBES solitary in all the intervals or in pairs in some of them (except sometimes *A. californica*); western species (except *A. curtisii*).
  OIL TUBES solitary in all the intervals.
    Leaves once or twice pinnate.
      Involucels of conspicuous bractlets ..... 1. *A. grayi.*
      Involucels none ..... 2. *A. pinnata.*
    Leaves ternate then pinnate.
      Stem and lower leaf surface densely tomentose ..... 3. *A. hendersoni.*
      Stem, etc., not densely tomentose.
        Involucels of numerous bractlets ..... 4. *A. genuflexa.*
        Involucels usually wanting ..... 5. *A. dawsoni.*
          Fruit glabrous; pedicels united at base.
            Fruit 6 to 8 mm. long, with lateral wings thick and corky. 6. *A. arguta.*
            Fruit 4 to 6 mm. long, with lateral wings not corky thickened. 7. *A. lyallii.*
          Fruit not glabrous; pedicels not distinctly united at base.
            Pubescent throughout; California ..... 8. *A. tomentosa.*
            Pubescence none except in the inflorescence.
              Fruit hispid; flowers white ..... 9. *A. kingii.*
              Fruit papillate; flowers greenish or purplish ..... 10. *A. roseana.*
  OIL TUBES in pairs in some of the intervals (except sometimes in *A. californica*); involucels wanting.
    Ovary and fruit glabrous.
      Fruit very small (3 mm.) ..... 11. *A. leporina.*
      Fruit large (8 to 12 mm.).
        Leaflets linear ..... 12. *A. lineariloba.*

Leaflets not linear.
Lateral wings not as broad as body; California..... 13. *A. californica.*
Lateral wings broader than body; Eastern..... 14. *A. curtisii.*
Ovary or fruit not glabrous.
Pedicels glabrous or nearly so; eastern Washington..... 15. *A. canbyi.*
Pedicels hispid.
Fruit oblong or narrowed below; leaflets acuminate; eastern California and adjacent Nevada..... 16. *A. breweri*
Fruit broad elliptical; leaflets acute; Utah..... 17. *A. wheeleri.*
OIL TUBES several in the intervals or continuous about the seed; Eastern species (except *A. ampla*).
Oil tubes several in the intervals; seed adherent to pericarp..... 18. *A. villosa.*
Oil tubes continuous about the seed, which is loose in the pericarp.
Stout, with purple stems.
Inflorescence glabrous; lateral wings half as broad as body; North Atlantic region..... 19. *A. atropurpurea.*
Inflorescence puberulent; lateral wings but one-sixth as broad as body; Rocky Mountains..... 20. *A. ampla.*
Slender; lateral wings as broad as body; Florida..... 21. *A. dentata.*

1. **Angelica grayi** C. & R.

Selinum grayi C. & R. Bot. Gaz. **13**: 144. 1888.

Usually very stout, 3 to 6 dm. high, glabrous except the more or less scabrous inflorescence, leaf margins, and veinlets (beneath); leaves once or twice pinnate, with much-dilated petioles; leaflets oblong to ovate, 2.5 cm. long, acute, toothed (sometimes laciniately toothed or lobed); umbel with involucels of conspicuous lanceolate-ovate long-acuminate bractlets; rays 2.5 to 3.5 cm. long; pedicels 2 to 4 mm. long; fruit oblong, smooth, 4 to 5 mm. long, with prominent thin wings, the laterals decidedly broadest; seed face dorsally sulcate.

Type locality, Westons Pass, "in high mountains of Colorado," altitude 3,450 meters; collected by *J. M. Coulter*, July 19, 1873; type in Herb. Coulter.

High mountains of Colorado and adjacent Wyoming.

Specimens examined:

COLORADO: Type specimens as cited under type locality; Twin Lakes, altitude 2,850 meters, *Wolf* 712, August, 1873; Pikes Peak, altitude 2,700 meters, *Letterman* 224, August 13, 1884; Graymont, *Letterman*, July 23, 1885; La Plata Mountains, *Alice Eastwood*, July 23, 1890; above Beaver Creek, altitude 3,450 meters, *Crandall* 19, August 1, 1892; Telluride, altitude 3,300 meters, *Tweedy* 207, August 25, 1894; North Park, *Osterhout*, June, 1895; mountain near Boreas, altitude 3,600 meters, *Cowen* 190, August 2, 1895; Gore Mountains, altitude 2,850 meters, *Bethel*, August, 1895; Chambers Lake, altitude 2,850 meters, *Baker*, July 13, 1897; La Plata Mountains, altitude 3,450 meters, *Baker, Earle & Tracy* 639, July 16, 1898.

WYOMING: La Plata mines, *Nelson* 1776, August 21, 1895.

2. **Angelica pinnata** Watson, Bot. King Surv. 126. 1871.

Glabrous, 6 to 9 dm. high; leaves simply pinnate, with 2 to 4 pairs of ovate to narrowly lanceolate sharply serrate to entire leaflets (lowest pair sometimes pinnate); umbels 10 to 20-rayed, with neither

involucre nor involucels; rays 5 to 10 cm. long; pedicels 4 mm. long; flowers greenish-yellow or dull purple; stylopodium slightly conical; fruit oblong, glabrous (at maturity), 4 to 6 mm. long; dorsal and intermediate ribs thick and prominent; laterals with wings hardly as broad as body; oil tubes solitary in all the intervals.

Type locality, "Uinta Mountains, Utah, altitude 2,400 meters;" collected by *Watson*, no. 458, August, 1869; type in U. S. Nat. Herb.

In the mountains, from New Mexico through Colorado and Utah to Wyoming and Montana.

Specimens examined:

NEW MEXICO: Chama, *Alice Eastwood*, August 1, 1892.

UTAH: Type specimens as cited under locality; slope of Aquarius Plateau, altitude 2,550 meters, *Ward* 421, June 25, 1875; Alta, altitude 2,550 meters, *Jones*, August, 1879; Fish Lake, altitude 2,700 to 3,000 meters, *Jones* 5731, 5822, August 3–10, 1894.

COLORADO: Routt County, *Alice Eastwood*, July 29, 1891; Grand River, *Beardslee* 136, August, 1892; Durango, *Alice Eastwood*, August, 1892; Gunnison County, altitude 2,700 meters, *Coven*, August 2, 1892; near Cimarron, altitude 2,100 meters, *Crandall*, August 21, 1896.

WYOMING: Yellowstone Park, *Tweedy*, July, 1885; same station, *Letterman*, August 4, 1885; same station, *Knowlton*, August 14, 1887; same station, *Burglehaw*, August, 1893; same station, *Rose* 168, 364, August, 1893; same station, *Rydberg* 4602, 4606, 4607, 4609, August 7–10, 1897; Upper Big Wind River, *Nelson* 755, August 10, 1894; Woods Creek and Lincoln Gulch, *Nelson* 2689, August 11–20, 1896; Sylvan Geysers, Yellowstone Park, *A. & E. Nelson* 6188, July 26, 1899.

MONTANA: Near the Yellowstone Park, *Rose* 477, August 23, 1893.

3. **Angelica hendersoni** C. & R. Bot. Gaz. **13**: 80. 1888.

Very stout, densely tomentose throughout, especially the inflorescence and whitened lower surfaces of the leaves; leaves quinate then pinnate; leaflets thick, broadly ovate, 7.5 to 10 cm. long, 5 to 7.5 cm. broad, obtuse, broad cuneate or rounded at base, serrate; umbel equally many-rayed, with no involucre, and involucels of numerous linear-acuminate bractlets; rays 2.5 to 7.5 cm. long; pedicels 1 to 2 mm. long; ovary densely tomentose; fruit oblong, more or less pubescent, 6 to 9 mm. long; dorsal and intermediate ribs prominent; lateral wings thick and corky, as broad as body; oil tubes solitary in all the intervals.

Type locality, "bluffs moistened by sea spray, Long Beach, Ilwaco [Pacific County], Washington;" collected by *Henderson*, no. 2158, August 5, 1885; type in Herb. Coulter.

Seacoast, from southern Washington to San Francisco.

Specimens examined:

WASHINGTON: Type specimens as cited under type locality; type locality, *Henderson* 2158, September 7, 1892.

CALIFORNIA: Berkeley, *G. R. Vasey*, in 1875; bluffs along the Golden Gate, Lands End, and Lake Merced, San Francisco, *Alice Eastwood*, October 5–6, 1895.

4. **Angelica genuflexa** Nutt. in Torr. & Gray Fl. **1**: 620. 1840.

Archangelica peregrina Nutt. in Torr. & Gray, Fl. **1**: 622. 1840.

Glabrous except the pale puberulent inflorescence, 6 to 12 dm. high; leaves once to twice ternate, the divisions often deflexed; leaflets ovate to lanceolate, more or less acuminate, irregularly and sharply serrate and sometimes lobed; umbel equally many-rayed, with no involucre, and involucels of numerous linear bractlets; rays 2.5 to 10 cm. long; fruiting pedicels 8 to 12 mm. long; fruit 3 to 4 mm. long, nearly round, emarginate at base and apex, glabrous; lateral wings broader than body; stylopodium strongly conical; oil tubes solitary in all the intervals.

Type locality, "Wappatoo Island, and near Fort Vancouver," Clark County, Wash.; collected by *Nuttall*.

From Oregon to southern Alaska.

Specimens examined:

OREGON: Near Fort Klamath, altitude, 1,470 meters, *Leiberg* 701, August 11, 1894.

WASHINGTON: Klickitat River, near Mount Adams, *Suksdorf* 762, August–September, 1895; Lake Cushman and Seattle, *Piper* 628, 907, August–September, 1890; near Olympia, *Henderson* 2524, October 2, 1892; Upper Valley of the Nesqually, *Allen* 36, August–October, 1894; near Montesano, Chehalis County, *A. A. & E. Gertrude Heller* 4035*a*, July 11, 1898.

BRITISH COLUMBIA: Craigellachie, *Macoun*, July 18, 1889; Victoria, *J. R. Anderson*, September, 1900.

ALASKA: Sitka and Kadiak, *Kellogg* 102, 104, 181, in 1867; Popof Strait, Shumagin Islands, *Dall*, October 15, 1873; Sitka, *Eermann* 195, August 13, 1892; Yes Bay, *Howell* 1761, August 17, 1895; same station, *Gorman* 164, September 16–October 9, 1895.

5. **Angelica dawsoni** Watson Proc. Am. Acad. **20**: 369. 1885.

Thaspium aureum involucratum C. & R. Rev. N. Am. Umbell. 83. 1888.

Glabrous or nearly so, rather slender, 3 to 9 dm. high, with simple stem; basal leaves twice to thrice ternate; leaflets lanceolate, 2.5 to 5 cm. long, sharply and finely serrate, acute or acuminate, terminal one sometimes deeply 3-cleft; cauline leaves (1 or 2 or none) similar; umbel solitary, conspicuously involucrate with numerous foliaceous lacerately toothed bracts nearly equaling the rays, and involucels similar; rays about 2.5 cm. long or less; pedicels 4 to 6 mm. long; fruit glabrous, 5 mm. long.

Type locality, "Rocky Mountains near the boundary," altitude 1,950 meters; collected by *Lyall*, in 1861; type in Herb. Gray.

Rocky Mountains of northern Idaho and Montana, and northwestward.

Specimens examined:

IDAHO: Kootenai County, *Sandberg*, July, 1887; valley of Traille River, Kootenai County, *Sandberg* 889, August 10, 1892; Stevens Peak, Cœur d'Alene Mountains, altitude 1,900 meters, *Leiberg*, 455, August 4, 1895.

MONTANA: Near Columbia Falls, altitude 2,100 meters, *Williams* 1013, July 12 and August 30, 1895.

ALBERTA: Sheep Mountains, *Macoun*, in 1895.
BRITISH COLUMBIA: Type specimens as cited under type locality.

Angelica arguta Nutt. in Torr. & Gray Fl. **1**: 620. 1840.

Glabrous, except the sometimes minutely puberulent inflorescence, stout, 6 to 12 dm. high; leaves ternate then pinnate or bipinnate; leaflets mostly small, ovate to lanceolate, rather acute, serrate; umbel rather equally many-rayed, with neither involucre nor involucels; rays 2.5 to 7.5 cm. long; pedicels 6 to 10 mm. long; fruit oblong-elliptical, glabrous, 6 to 8 mm. long; dorsal and intermediate ribs thick and slightly elevated; lateral wings very corky, thick, and as broad as the much-flattened body or broader; oil tubes 2 on the commissural side, distant, or sometimes 4 in two distant pairs; seed sulcate beneath the oil tubes, with plane face.

Type locality said to be "Wappatoo Island and near Fort Vancouver," in the Lower Columbia River Basin; collected by *Nuttall;* type in Herb. Torrey.

Specimens examined:

OREGON: Type specimens as cited under type locality.

In the Revision we stated that "this plant was reported by Nuttall from 'Fort Vancouver, Oregon,' and then lost sight of, being confused with *A. genuflexa*. An examination of the type (in good fruit in the Torrey Herbarium) abundantly confirms our conclusions given in Botanical Gazette xiii, 80." Unfortunately no new material of this species has come to light during the last twelve years, which has led some of our best Western collectors to doubt our conclusions. Nuttall, who collected the type, obtained it (at least in part) from Wappatoo Island, in the Lower Columbia. At the same place he collected *Angelica genuflexa* and *Archangelica peregrina*. The inference has been that these three species are one and the same. Mr. L. F. Henderson has collected extensively in recent years on this island, and has found only one species. This has led us to reexamine the type, and our opinion is that *A. arguta* is different from *A. genuflexa*. It seems much nearer *A. lyallii*, to which we were once constrained to refer it. It grows at so much lower elevations, however, that it seems impossible to consider the two identical.

7. **Angelica lyallii** Watson, Proc. Am. Acad. **17**: 374. 1882.

Glabrous except the sometimes puberulent inflorescence, stout, 6 to 15 dm. high; leaves ternate then once or twice pinnate, the uppermost reduced to large inflated petioles; leaflets extremely variable in size, ovate to lanceolate, rather acute, serrate or dentate; umbel many-rayed, with neither involucre nor involucels; rays 2.5 to 25 cm. long; pedicels 2 to 10 mm. long, coalescent at base (giving a "web-footed" appearance); fruit oblong to obovate, glabrous, 4 to 6 mm. long; dorsal and intermediate ribs thick and slightly elevated; lateral wings as broad as the often much flattened body or broader; oil tubes solitary in all the intervals.

Type locality, "in the Galton and Cascade Mountains, near the British boundary;" collected by *Dr. Lyall.*

In the mountains, from eastern Oregon to northwestern Wyoming and northward to Alberta.

Specimens examined:

ALBERTA: Sheep Mountain, Waterton Lake, *Macoun* 10676, July, 1895.

WASHINGTON: Mount Adams, altitude 1,800 to 2,100 meters, *Suksdorf* 761, August-September, 1885; *G. R. Vasey*, in 1889; Olympic Mountains, *Piper* 1052, September 27, 1890; Yakima County, *Henderson* 2523, July 31, 1892; Blue Mountains, Columbia County, altitude 1,200 meters, *Piper* 2336, July 15, 1896.

OREGON: White Mountains, altitude 1,200 to 1,800 meters, *Cusick* 1056, in 1884; Hood River, *Howell*, July 27, 1886; *Sheldon* 8638, in 1897.

IDAHO: Nez Perces County, *Sandberg* 393, June 14, 1892; Lake Cœur d'Alene, *Sandberg* 565, July 6, 1892; Lake Pend Oreille, *Leiberg* 151, June–September, 1892; Moscow Mountains, *Henderson* 2666; Nez Perces County, altitude 1,050 meters, *Brown* 10, August, 1893; Pettit Lake, altitude 2,160 meters, *Evermann* 385, August 13, 1895; Mill Creek and near Salmon, altitude 2,250 to 2,400 meters, *Henderson* 4066, 4067, August, 1895; Cœur d'Alene Mountains, altitude 850 meters, *Leiberg* 333, July 21, 1895; near Reeder Creek, altitude 900 meters, *Leiberg* 2742, July 23, 1897; near Lake Cœur d'Alene, *Henderson* 4606, August 7, 1898; Weiser River and Payette Lake, *Jones*, June 15–26, 1899.

MONTANA: Near Red Lodge, *Rose* 31, 478, July–September, 1893; Columbia Falls, *Williams* 379, August 20, 1894; Spanish Basin, Madison Range, altitude 1,800 meters, *Flodman* 691, July 22, 1896; Indian Creek and Forks of the Madison, *Rydberg* 4603, 4604, July 21–26, 1897.

WYOMING: Yellowstone Park, *Tweedy;* same station, *Rydberg* 4608, August 7, 1898; Moose Falls, Yellowstone Park, *A. & E. Nelson* 6579, August 21, 1899.

8. **Angelica tomentosa** Watson, Proc. Am. Acad. **11**: 141. 1876.

Stout with coarse hoary pubescence; leaves ternate or quinate then once or twice pinnate; leaflets thickish, ovate, acute, oblique at base, 5 to 10 cm. long, unequally and sharply serrate or toothed; umbel somewhat equally many-rayed, with neither involucre nor involucels (rarely a bractlet or two); rays 2.5 to 10 cm. long; pedicels 8 to 12 mm. long; ovary densely pubescent; fruit oblong-elliptical, more or less pubescent, 6 to 8 mm. long, 4 to 5 mm. broad; dorsal and intermediate ribs small and acutish; lateral wings thin, about as broad as body; stylopodium low conical, with long reflexed styles; oil tubes solitary in all the intervals.

Type locality, "in the coast ranges from San Francisco to Mendocino County, Cal.;" type in Herb. Gray.

In the mountains from Mendocino County to San Diego County, Cal.

Specimens examined:

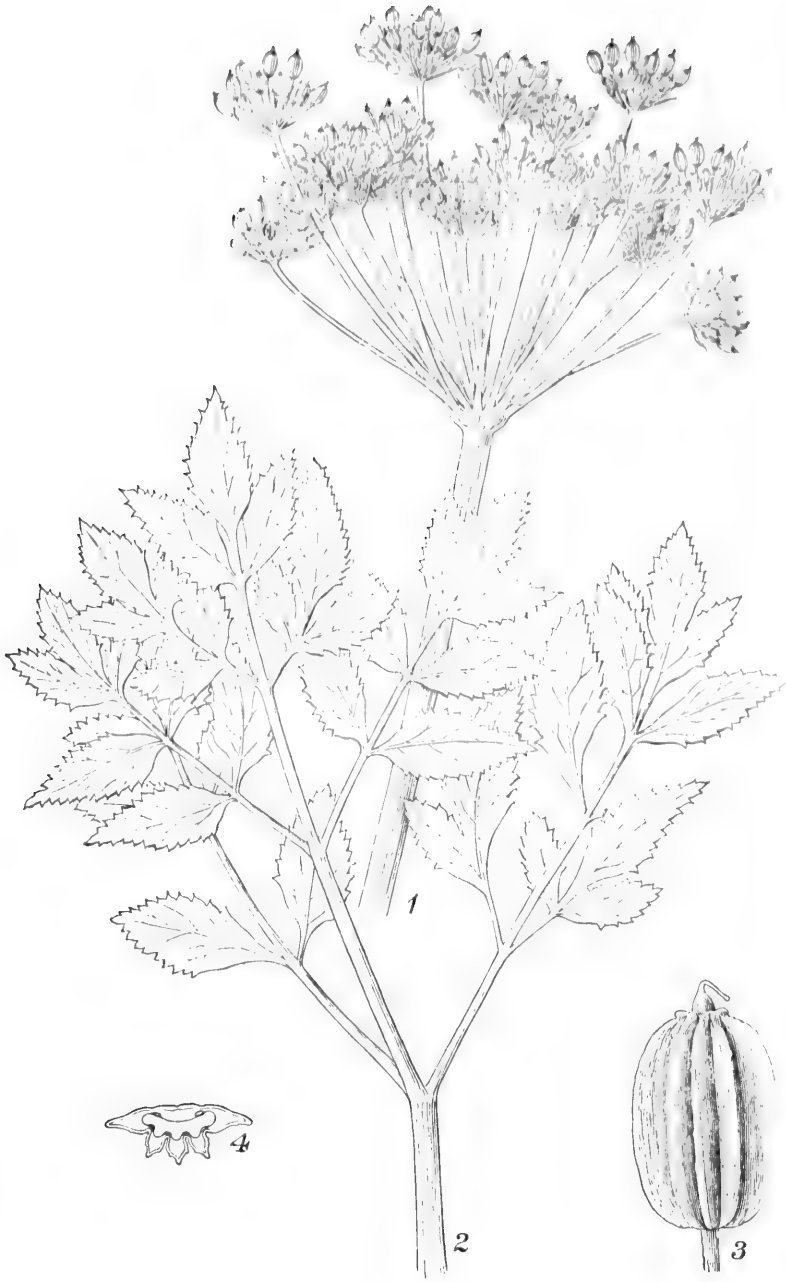
CALIFORNIA: Near San Francisco, *Wilkes Exped.* 1377; *Kellogg & Harford* 317, 1161, in 1868–69; Sausalito, Marin County, and Mendocino County, *G. R. Vasey*, in 1875; Howell Mountain, Napa River Basin, *Jepson*, February 23, 1896; San Jacinto Mountains, San Diego County, *Hall* 740, July 29, 1897.

A specimen collected by *Lemmon* in June, 1887, in the "Sierra Valley," has been referred to this species, but it is so distant from the normal range that we doubt it. The lack of foliage and good fruit prevents any more definite disposition of it.

9. **Angelica kingii** (Watson) C. & R.

Selinum kingii Watson, Bot. King Surv. 126. 1871.

Smooth (except the slightly pubescent inflorescence), 3 to 6 dm. high; lower leaves bipinnate, the upper nearly simply pinnate, with



ANGELICA ROSEANA HENDERSON.

dilated petioles; leaflets ovate or linear-lanceolate, 2.5 to 7.5 cm. long, coarsely and unevenly serrate; umbel 5 to 10-rayed, with neither involucre (rarely a bract or two) nor involucels; pedicels 4 to 6 mm. long; fruit broadly ovate, hispid, 4 to 6 mm. long; lateral wings broader than the narrow dorsal and intermediate ones; stylopodium low conical; oil tubes solitary in all the intervals.

Type locality, "East and West Humboldt Mountains, California, and in Ruby Valley, Nevada;" collected by *Watson*, no. 456, in 1868; type in U. S. Nat. Herb.

An aquatic in the mountains of northeastern California, northern Nevada, and southern Idaho.

Specimens examined:

California: West Humboldt Mountains, *Greene*, July 21, 1894.

Nevada: Ruby Valley, altitude 1,800 meters, *Watson* 456, August, 1868.

Idaho: Near Shoshone Falls, Snake River, *Henderson* 4596, July 26, 1897.

10. **Angelica roseana** Henderson, Contr. Nat. Herb. **5**: 201. pl. 26. 1899. Plate VI.

Low and very stout, 5 to 6 dm. high, with glabrous and usually purplish stems, and more or less scabrous inflorescence; leaves twice or thrice ternate then pinnate; upper stem leaves reduced, with large inflated petioles; leaflets broadly ovate to lanceolate, thick, with prominent veins, laciniately mucronate-toothed, 2.5 to 3.5 cm. long, obtuse or acute, glabrous or more or less scabrous; umbels with very unequal rays, no involucre (or sometimes 1 or 2 bracts), and involucels of few filiform and very scabrous bractlets; flowers greenish or tinged with purple; ovaries glabrous or puberulent; fruit broadly oblong-elliptic, more or less scabrous, 4 to 5 mm. long; dorsal and intermediate ribs often nearly as prominent as the lateral, thick and corky; stylopodium conical; oil tubes mostly solitary in the intervals.

Type locality, "banks of dried, gravelly rills, foothills of the Lost River Mountains [near Salmon], Fremont County, Idaho;" collected by *Henderson*, no. 4065, August 15, 1895; type in U. S. Nat. Herb.

Mountains of Idaho and adjacent Montana, Wyoming, and Utah.

Specimens examined:

Idaho: Type specimens as cited under type locality; Salmon River, near Yankee Fork, *Henderson* 3809, August 1, 1895; Mount Chauret, boundary between Idaho and Montana, *Rydberg* 4605, July 27, 1897.

Montana: Lone Mountain, *Tweedy* 1056, August, 1889; near Boulder Creek, Bitter Root Forest Reserve, altitude 1,820 meters, *Leiberg* 3003, September 17, 1897.

Wyoming: Little Goose Canyon, *Nelson* 2355, July 15, 1896; Sierra Madre, Carbon County, *Nelson* 3493, August 16, 1897; Teton Mountains, *A. & E. Nelson* 6500, August 16, 1899; Big Horn Mountains, Sheridan County, *Tweedy* 2431, August, 1899.

Utah: Uinta Mountains, altitude 3,000 meters, *Watson* 459, August, 1869 (distributed as *Archangelica gmelini*).

Explanation of Plate VI.—Fig. *1*, umbel; *2*, leaf; *3*, dorsal view of carpel; *4*, cross section of carpel.

11. **Angelica leporina** Watson, Proc. Am. Acad. **12**: 252. 1877.

Tall and rather slender, 6 to 9 dm. high, glabrous; leaves bipinnate; leaflets linear to broadly lanceolate, acuminate, coarsely or laciniately toothed to entire, 2.5 to 7.5 cm. long; umbel very unequally 10 to 25-rayed, with neither involucre nor involucels (or with a few deciduous bractlets); rays somewhat scabrous, 1 to 7.5 cm. long; pedicels 4 to 6 mm. long; fruit glabrous, very small, about 3 mm. long; dorsal and intermediate ribs prominent; lateral wings narrower than body; oil tubes solitary in the intervals, or the lateral in pairs.

Type locality, damp soil, "Rabbit Valley, [Southern] Utah," altitude 2,010 meters; collected by *L. F. Ward*, no. 612, August 18, 1875; type in U. S. Nat. Herb.

Southern Utah.

Specimens examined:

UTAH: Type specimens as cited under type locality; southern Utah, *Palmer* 183, in 1877; Cottrell's Ranch (altitude 1,800 meters), Mount Ellen, Henry Mountains (altitude 3,000 meters), and Elk Ranch (altitude 2,100 meters), *Jones* 5058, 5084, 6039, July–September, 1894.

12. **Angelica lineariloba** Gray, Proc. Am. Acad. **7**: 347. 1868.

Stout, glabrous, 6 to 9 dm. high; leaves twice or thrice quinate; leaflets linear, 2.5 to 10 cm. long, cuspidately acuminate, entire or the lower ones 3-parted with the decurrent sometimes coarsely toothed lobes divaricate; umbels with neither involucre nor involucels; rays 2.5 to 5 cm. long; fruit oval-oblong, glabrous, 8 mm. long, 4 mm. broad; dorsal and intermediate ribs filiform; lateral wings thickish, a little narrower than the body; oil tubes solitary in the dorsal intervals, in pairs in the laterals.

Type locality, "Ostrander's Meadows, Yosemite Valley," California, altitude 2,400 meters; collected by *Bolander;* type in Herb. Gray.

Sierra Nevada of southern California.

Specimens examined:

CALIFORNIA: "Southern Sierras," altitude 2,850 meters, *Rothrock* 355, September, 1875; near Mineral King, Sierra Nevada (Tulare County), altitude 2,750 meters, *Coville & Funston* 1479, August 4, 1891.

13. **Angelica californica** Jepson, Erythea **1**: 8. 1893.

Stems about 12 dm. high, glabrous, with puberulent inflorescence and leaves; leaves once or twice ternate then once or twice pinnate; leaflets ovate, about 5 cm. long, the terminal one mostly 3-lobed, the lower often lobed or divided at base, all irregularly serrate with mucronulate teeth; umbel with numerous unequal rays, and neither involucre nor involucels; rays 2.5 to 15 cm. long; pedicels about 6 mm. long; fruit oblong, 8 to 9 mm. long, glabrous, with winged dorsal and intermediate ribs, and lateral wings not as broad as body; oil tubes mostly 3 in the intervals.

Type locality, "Gates Canyon, Vaca Mountains," California; collected by *Jepson*, June 20, 1892; type in Herb. Univ. Calif.

Central California, in the bay region.

Specimens examined:

CALIFORNIA: Sausalito, Marin County, *G. R. Vasey*, in 1875.

14. **Angelica curtisii** Buckley, Am. Jour. Sci. **45**: 173. 1843.

Glabrous, 6 to 9 dm. high; leaves twice ternate or the divisions pinnate, the uppermost mostly reduced to large inflated petioles; leaflets thin, ovate-lanceolate (2.5 to 7.5 cm. broad), sharply and irregularly toothed; umbel somewhat pubescent, equally 15 to 25-rayed, with no involucre but with involucels of subulate bractlets; rays 5 to 7.5 cm. long; pedicels 8 to 12 mm. long; fruit broadly oblong, glabrous, 4 to 8 mm. long, emarginate at base; dorsal and intermediate ribs acute and prominent, often somewhat winged; lateral wings thin, broader than body; oil tubes mostly solitary in the intervals, sometimes 2 or 3.

Type locality, "high mountains of North Carolina, especially the Bald Mountain in Yancey County;" collected by *M. A. Curtis;* type in Herb. Gray.

In the Alleghanies from Pennsylvania to North Carolina.

Specimens examined:

PENNSYLVANIA: Burgoon Gap, Blair County, *Porter, Lowrie, Garber*, September 17, 1869.

VIRGINIA: Peaks of Otter, Bedford County, altitude 1,200 meters, *A. H. Curtiss*, August 28, 1880; Salt Pond Mountain, *Canby* 92, August, 1890.

NORTH CAROLINA: Roan Mountain, altitude 1,710 meters, *Chickering*, August 5, 1880; same station, altitude 1,800 to 1,900 meters, *Merriam*, September 9–11, 1892.

15. **Angelica canbyi** C. & R. Rev. N. Am. Umbell. 40. 1888.

Glabrous throughout except the puberulent inflorescence, 6 to 9 dm. high; leaves bipinnate; leaflets linear to ovate, 2.5 to 5 cm. long, acute or acuminate, laciniately toothed; umbel rather equally 10 to 20-rayed, with neither involucre nor involucels; rays 2.5 to 5 cm. long; pedicels slender, 6 to 8 mm. long, glabrous or nearly so; flowers pinkish; fruit oblong, glabrous at maturity (densely puberulent when young), 6 mm. long; dorsal and intermediate ribs thin and very prominent, somewhat winged; lateral wings rather thin, half as broad as body; stylopodium conical; oil tubes solitary in dorsal intervals, in pairs in the laterals.

Type locality, "low grassy ground along streams, Klickitat River, near Mount Adams," Washington; collected by *W. N. Suksdorf*, no. 763, flower June 26, fruit August, 1885; type in Herb. Coulter.

Eastern Washington.

Specimens examined:

WASHINGTON: *Brandegee* 796, August, 1883; type specimens as cited under type locality; *G. R. Vasey* 301, 461, in 1889; *Sandberg & Leiberg* 420 in part, in 1893; Blue Mountains, Wallawalla County, *Piper* 2335, July 15, 1896; same station, *Horner* 218, 219, July–September, 1897.

16. **Angelica breweri** Gray, Proc. Am. Acad. **7**: 348. 1868.

Glabrous or somewhat puberulent (especially in the inflorescence), 9 to 12 dm. high; leaves ternate or quinate then pinnate; leaflets lanceolate or oblong-lanceolate, acuminate, 5 to 12.5 cm. long, sharply serrate with cuspidate teeth, the lower sometimes lobed at base; umbel many-rayed, with neither involucre nor involucels (or with a few deciduous bractlets); rays 5 to 7.5 cm. long; pedicels 4 to 8 mm. long; stylopodium conical, with long style; fruit oblong or somewhat narrowed below, pubescent or becoming glabrous, 5 to 10 mm. long; dorsal and intermediate ribs more or less prominent; lateral wings narrow and as thick as the flattened body; oil tubes 1 or 2 in the intervals.

Type locality, "Sierra Nevada, near Ebbetts Pass," Alpine County, Cal.; collected by *Brewer;* type in Herb. Gray. Associated with it in the original description are *Brewer* "on the Big-tree road," and *Torrey* "near Donner Lake."

Mountains of eastern California and adjacent Nevada.

Specimens examined:

CALIFORNIA: Pine Grove, Amador County, altitude 660 meters, *Hansen* 326, June 3, 1894; mountains near Yosemite, *Canby,* August 16, 1895.

NEVADA: East Humboldt Mountains, altitude 2,400 meters, *Watson* 457, August, 1868.

The Californian material has fruit 9 to 10 mm. long, while the fruit of Watson's Nevada specimens is but 5 to 6 mm. long.

17. **Angelica wheeleri** Watson, Am. Nat. **7**: 301. 1873.

Tall and stout, rough puberulent; leaves biternate; leaflets ovate-oblong, 5 to 7.5 cm. long, acute, incisely serrate, the teeth broad and mucronulate, middle leaflet petiolulate; umbel unequally many-rayed, with neither involucre nor involucels; rays becoming 5 to 13 cm. long; pedicels and ovary hispid; fruit broad-elliptical, 6 mm. long, somewhat pubescent; the dorsal and intermediate ribs thick, narrower than the thick lateral ones; oil tubes solitary in the dorsal intervals, in pairs in the laterals.

Type locality, "Utah;" collected by *Wheeler;* type in Herb. Gray, duplicate in U. S. Nat. Herb.

We have seen only the type specimens, and the plant seems not to have been collected since.

18. **Angelica villosa** (Walt.) B. S. P. Prel. Cat. N. Y. 22. 1888.

Ferula villosa Walt. Fl. Car. 115. 1788.
Angelica hirsuta Muhl. Cat. ed. 2. 30. 1818.
Archangelica hirsuta Torr. & Gray Fl. **1**: 622. 1840.
Archangelica villosa Kuntze, Rev. Gen. Pl. **1**: 265. 1891.

Tomentose above, 6 to 15 dm. high; leaves twice or thrice pinnately or ternately divided, the uppermost mostly reduced to large inflated petioles; leaflets thickish, lanceolate to oblong, 1 to 2.5 cm. broad, serrate; umbel equally many-rayed, with no involucre, and involucels

of linear bractlets; rays 2.5 to 5 cm. long; pedicels 4 mm. long; fruit early round, pubescent, 4 mm. in diameter; dorsal and intermediate ribs prominent; lateral wings thin, as broad as body; stylopodium small, low conical; oil tubes 3 to 6 in the intervals (sometimes 1 or 2), 6 to 10 on the commissural side.

Type locality not given, but presumably in the Carolinas; type in Herb. Brit. Mus.

Dry soil, Connecticut to Florida and west to Minnesota, Missouri, and Mississippi.

Specimens examined:

CONNECTICUT: Near Westport, *Pollard* 198, July 18, 1894.

NEW YORK: Ithaca, *Coville*, August 8, 1885; Junius, *Roelee*, August 4, 1893; Van Cortlandt Park, New York City, *Pollard*, June, 1893.

PENNSYLVANIA: Delaware County, near Cold Springs, *Small*, August 7, 1889; Lancaster County, *Heller* 552, September 6, 1892.

NEW JERSEY: Near Clifton, Passaic County, *Nash*, August, 1891 and 1892; near Stockholm, Sussex County, *Van Sickle*, July, 1894.

MARYLAND: Woodside, *Pollard* 691, September 20, 1895.

DISTRICT OF COLUMBIA: Zoological Park, *Pollard* 521, July 26, 1895.

VIRGINIA: *Ball*, September, 1884; Salt Pond Mountain, *Canby*, August, 1890; Pittsylvania County, *Heller* 1103, July 20, 1893.

WEST VIRGINIA: Upshur County, *Pollock*, July 29, 1895.

NORTH CAROLINA: Near Biltmore, *Bilt. Herb.* 1327, August 12, 1896; Tryon, Polk County, *Townsend*, August 4, 1897.

SOUTH CAROLINA: Aiken, *Ravenel*, June, 1869.

TENNESSEE: Cocke County, *Kearney* 705, September 11, 1897; near Knoxville, *Ruth* 419, June, 1898.

MISSISSIPPI: Waynesboro, Wayne County, *Pollard* 1246A, August 8–9, 1896.

MISSOURI: Eagle Rock, *Bush* 16, June 26, 1897.

ILLINOIS: *Vasey*.

19. **Angelica atropurpurea** L. Sp. Pl. 1: 251. 1753.

Angelica triquinata Michx. Fl. Bor. Am. 1: 167. 1803.
Archangelica atropurpurea Hoff. Umbel. 162. 1814.

Very stout, smooth, with dark purple stem, 12 to 18 dm. high; leaves ternate then pinnate; leaflets ovate to lanceolate, 2.5 to 7.5 cm. long, sharply cut mucronate-serrate; umbel more or less puberulent, equally 15 to 25-rayed, with no involucre, and involucels of few short subulate bractlets; rays 2.5 to 7.5 cm. long; pedicels 10 to 16 mm. long; fruit oblong, glabrous, 6 mm. long; dorsal and intermediate ribs very prominent, lateral wings thin, about half as broad as body; stylopodium low conical; oil tubes 25 to 30 and continuous, 8 to 10 of them on the commissural side.

Type locality, "Canada."

Low river banks, from Labrador to Delaware, and west to Illinois and Minnesota.

Specimens examined:

VERMONT: Alpine region of the White Mountains, *Oakes;* Sunderland, *M. A. Day* 88, July 6, 1898.

MASSACHUSETTS: Topsfield, *Oakes*.
CONNECTICUT: Milford, *Eames*, June–August, 1893 and 1895.
NEW YORK: Ithaca, *Univ. Coll.*, July–September, 1875.
PENNSYLVANIA: Westmoreland County, *Pierron*, October 3, 1877.
MICHIGAN: Alma, *Davis*, June 29, 1891.
ILLINOIS: *Brendel*, in 1873; Lisle, Dupage County, *Umbach*, June 8, 1898.
MINNESOTA: Winona, *Holzinger*, July, 1888; Fort Snelling, *Mearns*, June 25, 1891.

20. **Angelica ampla** A. Nelson, Bull. Torr. Bot. Club **25**: 375. 1898.

Tall and stout, 15 to 25 dm. high, with purplish glabrous stems and puberulent inflorescence; leaves large, ternate then twice pinnate; leaflets ovate to obovate, short acuminate, serrate or toothed, 5 to 20 cm. long; umbels with very numerous nearly equal rays, no involucre, and usually involucels of setaceous bractlets; rays 5 to 10 cm. long; pedicels 10 to 12 mm. long; fruit broadly oblong, glabrous, 5 to 7 mm. long, the dorsal and intermediate ribs sharp (hardly winged), narrower than the thin very narrow lateral wings; oil tubes small and numerous, contiguous about the seed and adhering to it with the breaking down of the pericarp.

Type locality, "Sand Creek [Wyoming], near the Colorado line;" collected by *Aven Nelson*, no. 2046, in 1896; type in Herb. Nelson, duplicate in U. S. Nat. Herb. Associated with the type in the original description is *Nelson* 3460, in 1897, from Laramie River, near Jelm Mountain.

From southeastern Wyoming to the Pikes Peak region of Colorado.

Specimens examined:

WYOMING: Near Sherman, Albany County, altitude 2,400 meters, *Letterman* 221, July 29, 1884; type specimens as cited under type locality.
COLORADO: *Hall & Harbour* 219, in 1862; near Crested Butte, *Alice Eastwood*, in 1891; Colorado Springs and Central City, *Alice Eastwood*, September–October, 1892; South Park, *Cowen* 30, August 28, 1896.

21. **Angelica dentata** (Chapman) C. & R. Bot. Gazette **12**: 61. 1887.

Archangelica dentata Chapman in Torr. & Gray Fl. **1**: 622. 1840.

Slender, glabrous, 3 to 9 dm. high; leaves ternate, with long slender petioles and few leaflets, which are small, 1 to 2.5 cm. long, lanceolate, coarsely toothed or lobed; umbel slightly pubescent, equally 5 to 10-rayed, with no involucre, and involucels of subulate bractlets; rays about 2.5 cm. long; pedicels 6 to 8 mm. long; fruit broadly oblong, glabrous or pubescent, 5 mm. long; dorsal and intermediate ribs more or less prominent; lateral wings thin, as broad as body; oil tubes about 20 and continuous about the seed.

Type locality, "sandy pine barrens, Gadsden County, middle Florida;" collected by *Chapman;* type in Herb. Gray.

Dry pine barrens of Florida.

Specimens examined:

FLORIDA: *Chapman;* Aspalaga, *Curtiss* 1014, in 1880; Carrabelle, Franklin County, *Bilt. Herb.* 959, October, 1890.

3. **GLEHNIA** F. Schmidt in Miq. Ann. Mus. Bot. Lugd. Bat. **3**: 61. 1867.

Phellopterus Benth. in Benth. & Hook. Gen. Pl. **1**: 905. 1867. Not Nuttall.

Calyx teeth small. Fruit globose, glabrous. Carpel somewhat flattened dorsally, with 5 equal broad and corky thickened wings; lateral wings distinct from those of the other carpel; pericarp with no strengthening cells. Stylopodium depressed. Oil tubes 2 or 3 in the intervals (but appearing evenly distributed, owing to the narrowness of the intervals), 4 to 6 on the commissural side. Seed face slightly concave.

Low tomentose-villous herbs on the sands of the seashore, with once or twice ternate or ternate-pinnate coriaceous leaves, ovate to

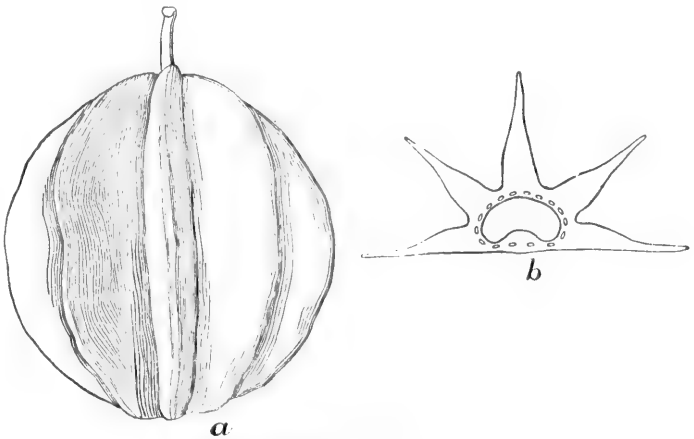


FIG. 49.—Glehnia littoralis: *a*, *b*, × 4.

roundish more or less confluent leaflets densely white tomentose beneath, involucre and involucels of subulate bracts, and glomerate whitish flowers.

A monotypic genus (based on *Cymopterus* (?) *littoralis* Gray) belonging to the American and Asiatic coasts of the northern Pacific.

1. **Glehnia littoralis** (Gray) Schmidt, l. c. FIG. 49.

Cymopterus (?) *littoralis* Gray, Pacif. R. Rep. Bot. **12**²: 62. 1860.
Phellopterus littoralis Schmidt, Mem. Acad. Petrop. VII. **12**: 138. 1868.

Subcaulescent; petioles elongated; leaflets callous-serrate to dentate, with impressed veinlets above, 2.5 to 5 cm. long; umbels shorter than the leaves, 10 to 12-rayed; rays 12 to 24 mm. long; umbellets capitate; fruit 8 to 10 mm. in diameter, the wings 3 mm. broad.

Type locality, "on the sands of the seashore at Shoalwater Bay," Puget Sound; collected by *Cooper;* type in Herb. Gray.

Sandy seashores from Oregon to Alaska; also in Korea and Japan.

Specimens examined:

OREGON: Tillamook Bay, *Howell*, July 14, 1882; mouth of Umpqua River, *Howell*, June 18, 1885.

WASHINGTON: Puget Sound, *Wilkes Exped.* 5; Westport, Chehalis County, *Henderson* 385, June 26, 1892.

BRITISH COLUMBIA: Oak Bay, Vancouver Island, *Macoun*, June 18, 1887.

ALASKA: Ankow River, near Ocean Cape, vicinity of Yakutat Bay, *Funston* 51, July 1, 1892.

The plant scarcely rises above the surface of the shifting sands, the leaves lying prostrate.

For *Cymopterus* (?) *littoralis* Gray it is usual to cite Mem. Am. Acad. 6: 391. 1859. This publication, however, is a *nomen nudum*, and refers to the Pacific Railway Report (at that time unpublished) cited above as the place of publication.

49. **PHELLOPTERUS** Nutt. in Torr. & Gray Fl. 1: 623. 1840.

Calyx teeth evident. Fruit oblong to orbicular in outline, glabrous. Carpel with 3 to 5 broad wings, thin throughout or slightly thickened

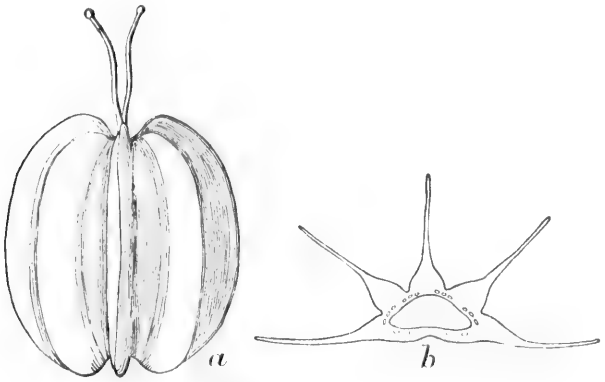


FIG. 50.—Phellopterus montanus: *a*, ×4; *b*, ×6.

at insertion, the laterals distinct from those of the other carpel. Stylopodium wanting. Oil tubes usually more than one in the intervals, 4 to 8 on the commissural side. Seed more or less dorsally flattened, the face with a shallow and broad concavity.

Acaulescent or short caulescent plants, with pale once or thrice pinnate leaves (segments usually short, broad, crowded, and more or less confluent), mostly conspicuous and similar more or less hyaline involucre and involucels, and purple flowers (except in *P. montanus*).

First species cited, *Phellopterus montanus* Nutt., under *Cymopterus montanus* Torr. & Gray.

A genus of five species, belonging to the plains and mountains of western United States.

Flowers white ..... 1. *P. montanus.*

Flowers pinkish or purple.

Involucels with bractlets lacerate-fringed at apex ..... 2. *P. macrorhizus.*

Involucels with entire bractlets.

Involucre mostly conspicuous; bracts and bractlets 1 to 3-nerved.

Fruit oblong, 8 mm. long ..... 3. *P. bulbosus.*

Fruit orbicular, 10 to 12 mm. long ..... 4. *P. purpurascens.*

Involucre mostly a low hyaline sheath; bracts and bractlets many-nerved. 5. *P. multinervatus.*

1. **Phellopterus montanus** Nutt. in Torr. & Gray Fl. **1**: 624. 1840. FIG. 50.

Cymopterus montanus Torr. & Gray Fl. **1**: 624. 1840.

Flowering umbels compactly clustered at the base of the rosette of much longer leaves, often appearing sessile, somewhat elongated in fruit; involucre inconspicuous, hyaline and lobed, sometimes reduced to a cup; involucels conspicuous, the bractlets distinct, obovate, entire, with very broad white and hyaline margins, with more or less distinct green central region; pedicels shorter than the bractlets; flowers white, sometimes purplish; fruit broadly oblong to nearly orbicular, 6 to 8 mm. long, with broad thin wings somewhat thickened at insertion; oil tubes 1 to 3 in the intervals, 4 to 8 on the commissural side; seed somewhat flattened, with broadly concave face.

Type locality, "high bare plains of the Platte, toward the Rocky Mountains;" collected by *Nuttall;* type in Herb. Philad. Acad.

Open plains of Colorado, Arkansas, Wyoming, Kansas, Nebraska, and South Dakota.

Specimens examined:

COLORADO: Type specimens as cited under type locality; *Hall & Harbour* 210, in 1862; Pueblo, *Hicks*, June 8, 1890; near Denver, *Alice Eastwood*, in 1891; near Windsor, *Osterhout*, May, 1895; near Denver, *Bethel*, May, 1895, and June, 1898; Fort Collins, *Crandall*, May 30, 1896; near Denver, *Holzinger*, May–June, 1896; Colorado Springs, *Rydberg*, May 9, 1900.

WYOMING: Fort Russell, *Ruby*, May, 1885; Laramie Plains, *Nelson*, May, 1893 and 1894.

SOUTH DAKOTA: Black Hills, *Rydberg* 726, June 14, 1892.

NEBRASKA: Deuel County, *Rydberg*, June 27, 1891.

KANSAS: Spearsville, Ford County, *Wentz*, April, 1886; Atwood, *Fry*, April 18, 1891.

ARKANSAS: Fort Lyon, *Palmer*, April 9, 1863.

2. **Phellopterus macrorhizus** (Buckley) C. & R.

Cymopterus macrorhizus Buckley, Proc. Philad. Acad. 1861: 455. 1862.

Cymopterus montanus pedunculatus Jones, Proc. Calif. Acad. Sci II. **5**: 686. 1895.

Resembling *P. montanus*, but peduncles elongated, in fruit becoming twice as long as the leaves; umbels open, with longer unequal rays and longer pedicels; involucels of distinct usually obovate bractlets, with one to several nerves, and lacerate-fringed at apex; flowers pinkish; fruit smaller, 4 mm. long.

Type locality, "prairies north of Austin," Tex.; collected by *Buckley*, March, 1860; type in Herb. Philad. Acad.

Northeastern Texas.

Specimens examined:

TEXAS: *Mex. Bound. Surv.;* type specimens as cited under type locality; Belknap, *Sutton Hayes* 309; Dallas, *Woolson*, in 1873 (type of *Cymopterus montanus pedunculatus* Jones); Dallas, *Reverchon*, in 1874 and 1880; Shackelford County, *Holstein*, in 1883; Dallas, *Reverchon*, February 26, 1900.

This species is restricted to the prairie region of northeastern Texas, and is quite distinct in range from *P. montanus*, to which it has been referred. Mr. Reverchon has sent us living specimens from Dallas with the following note: "This species occurs on the limestone prairies of north Texas (how far south I do not know). It grows where the rocks crop out, and blooms quite early; in fact, it is the first bloomer I know of in Texas, sometimes appearing about Christmas when the winter is open."

3. **Phellopterus bulbosus** (A. Nelson) C. & R.

Cymopterus bulbosus Nelson, Bull. Torr. Bot. Club **26**: 241. 1899.

Leaf segments more crowded than in *P. montanus;* flowering umbel more elongated, in fruit equaling or exceeding the leaves; involucre conspicuous, of broad hyaline bracts united at base; involucels more conspicuous, the broad hyaline bracts sometimes with a greenish central region; pedicels longer than in *P. montanus;* flowers purplish; fruit oblong, much narrower than in *P. montanus*, 8 mm. long, with broad thin wings not thickened at insertion; oil tubes 3 to 5 in the intervals, 6 to 10 on the commissural side; seed face with rather deep and broad concavity.

Type locality not given, but label states "naked clay soil in the ravines and on the slopes of Green River," Wyoming; collected by *A. Nelson*, no. 4709, June 14, 1898; type in Herb. Univ. Wyoming, duplicate in U. S. Nat. Herb.

Green River region of Wyoming.

Specimens examined:

WYOMING: Green River, *Parry* 117, in 1873; La Barge, Uinta County, *Stevenson* 40, April 27, 1894; Point of Rocks, Sweetwater County, *Nelson* 3085, June 1, 1897; type specimens as cited under type locality.

4. **Phellopterus purpurascens** (Gray) C. & R.

Cymopterus montanus purpurascens Gray, Bot. Ives 15. 1860.
Cymopterus utahensis Jones, Calif. Acad. Sci. II. **5**: 684. 1895.
Cymopterus utahensis monocephalus Jones, l. c. 685.

Peduncles longer than in *P. montanus*, in fruit equaling or exceeding the leaves; umbels more or less compacted; involucre conspicuous, composed of white or purplish hyaline bracts which have 1 to 3 green or purplish nerves and are united at base, or sometimes reduced to a hyaline sheath; involucels resembling the involucres; flowers purple; fruit orbicular, with broad wings and oblong body, 10 to 12 mm. long; carpels somewhat flattened, with 5 broad thin wings scarcely thickened at insertion; oil tubes 2 or 3 in the intervals, 4 on the commissural side; seed somewhat flattened, with broadly concave face.

Type locality, "Yampai Valley to San Francisco Mountains;" collected by *Newberry;* type specimen in U. S. Nat. Herb.

In clay or gravel, New Mexico, Arizona, Utah, Nevada, and Idaho.

Specimens examined:

NEW MEXICO: Oryabe, *Newberry*, April and May, 1858; Fort Wingate, *Marsh*, May 24, 1883; Barranca, Taos County, *A. A. & E. Gertrude Heller*, May 26, 1897.

ARIZONA: Top of grade above Pagumpa, *Jones* 5098, April 23, 1894; near Black Rock Spring, *Jones* 5098*b* and 5098*p*, April 23, 1894 (types of *C. utahensis* Jones).

UTAH: *Palmer*, 1869; Grass Valley, *Lester F. Ward* 25, May 12, 1875; Terminus, May and June, and Cisco, May 2, 1890, *Jones*.

NEVADA: Trinity Mountains, *Watson* 449 as to fruit, May, 1868; Candelaria, *Shockley*, April, 1885.

IDAHO: Near Pocatello, *Palmer* 11, May 20, 1893.

While certain specimens show umbels so compact as to form globose heads in fruit, having suggested to Mr. Jones his var. *monocephalus*, we find that this is too variable a character to permit separation.

Phellopterus purpurascens eastwoodae (Jones) C. & R.

Cymopterus utahensis eastwoodae Jones, Calif. Acad. Sci. II. 5: 685. 1895.

More robust, 2 to 3 dm. high, with usually long peduncles; umbels and umbellets more open, with prominent rays and pedicels; wings of fruit much narrower, resulting in a narrow fruit; more eastern in range.

Type locality, "Durango, Colorado;" collected by *Alice Eastwood;* type specimen in U. S. Nat. Herb.

Colorado.

Specimens examined:

COLORADO: Durango, *Alice Eastwood*, June, 1890 and 1891; Gunnison, *Bethel* 22, June 27, 1898; Pueblo, *Rydberg*, May 14 and 15, 1900.

5. **Phellopterus multinervatus** C. & R., sp. nov.

Cymopterus purpurascens Jones, Calif. Acad. Sci. II. 5: 687. 1895. Not Gray.

Peduncles as in *P. purpurascens;* involucre a low hyaline more or less lobed sheath, or developing one or more conspicuous bracts resembling those of the involucel; involucels conspicuous, composed of broad purplish bractlets united at base, which are rounded at apex, many-nerved, and with narrow hyaline margins; flowers purple; fruit orbicular, with very broad wings and oblong body, 12 to 15 mm. long; carpels somewhat flattened, with 5 broad thin wings somewhat thickened at insertion; oil tubes 2 to 4 in the intervals, 8 on the commissural side; seed somewhat flattened, with broadly concave face.

Type locality, Peach Springs, northern Arizona; collected by *Mr. and Mrs. J. G. Lemmon*, May, 1884 (distributed as *Cymopterus montanus*); type specimen in U. S. Nat. Herb.

In clay and gravel, New Mexico, Arizona, Utah, and possibly California.

Specimens examined:

ARIZONA: Peach Springs, *Lemmon*, May, 1884; San Francisco Mountains, *Mac Dougal* 150, June, 1891; *Mrs. E. Shuttleworth*, in 1893; Fort Huachuca, *Eiler* in 1895.

NEW MEXICO: Mangus Springs, *Rusby*, in 1880; Carrizallilo Mountains, *Mearns* 38, April 17, 1892.

UTAH: *Bishop* 29, in 1872; Uinkaret Mountains, *Mrs. Thompson*, in 1872; near Bellevue, *Jones* 5002, March 30, 1894; Washington, *Jones* 5140*c*, May 1, 1894; Laverken, *Jones* 5196*m*, May 8, 1894.

NEVADA: Mount Sabb, Palmetto Range, altitude 2,700 to 3,000 meters, *Purpus* 5866, in 1898.

CALIFORNIA: *Whipple*, in 1853–54.

Mr. Marcus E. Jones recognized and defined this species, but regarded it to be the same as *Cymopterus montanus purpurascens* Gray. An examination of the type specimen of Gray's variety, however, shows it to be the same as *C. utahensis* Jones. It is necessary, therefore, to refer Mr. Jones's *C. utahensis* to our *P. purpurascens* and to give a new name to his *C. purpurascens*.

50. PTERYXIA Nutt. in Torr. & Gray Fl. 1: 624. 1840.

Calyx teeth evident. Fruit oblong to orbicular in outline, glabrous. Carpel usually strongly flattened dorsally, with wings thin through

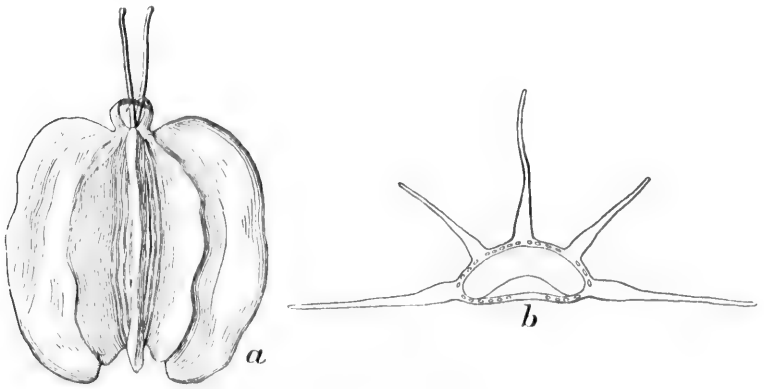


FIG. 51.—Pteryxia terebinthina: *a*, × 4; *b*, × 6.

out, lateral ribs with broad wings, dorsal and intermediates from strongly ribbed to broadly winged. Stylopodium wanting. Oil tubes several in the intervals. Seed face plane or with a shallow and broad concavity.

Plants of acaulescent habit or nearly so, and clothed at base with persistent leaf sheaths, with bright green or somewhat pale leaves clustered at base with main divisions ternate then pinnately finely dissected into short linear more or less pungent segments (not so crowded or confluent as in *Phellopterus*), mostly no involucre, involucels of narrow bractlets (not at all hyaline), and yellow flowers (except in *P. albiflora*).

First species cited, *Pteryxia terebinthina* (*Selinum terebinthinum* Hook. Fl. Bor. Am. 1: 266. 1834).

A genus of at least 7 species, belonging to northwestern United States, from Wyoming to California, Oregon, and Washington.

The species of *Pteryxia* are very difficult of discrimination, and much of the material we have cited in connection with the types is in no condition to determine separately. There remains in herbaria considerable material which we have not attempted to refer, as it will need to be elucidated by further collections and field observations.

Flowers yellow.
Leaves with pale, narrow, and rigid segments ..... 1. *P. terebinthina.*
Leaves with segments greener and not so rigid.
Leaves of broad outline.
Low (1 to 3 dm.).
Dorsal ribs with broad wings ..... 2. *P. foeniculacea.*
Dorsal ribs with narrow wings ..... 3. *P. thapsoides.*
Taller (4 dm. or more) and stouter ..... 4. *P. californica.*
Leaves of narrower outline.
Pinnae small and distant ..... 5. *P. petraea.*
Pinnae larger and more crowded ..... 6. *P. calcarea.*
Flowers white ..... 7. *P. albiflora.*

1. **Pteryxia terebinthina** (Hook.) C. & R. FIG. 51.

Selinum terebinthinum Hook. Fl. Bor. Am. **1**: 266. pl. 95. 1834.
Cymopterus terebinthinus Torr. & Gray Fl. **1**: 624. 1840.
Pteryxia terebinthacea Nutt. in Torr. & Gray Fl. l. c.

Peduncles elongated, reaching 4 dm., considerably exceeding the leaves; leaves with ultimate segments pale, rigid, small and narrow, acute and mucronate, entire or toothed; umbels with unequal rays, no involucre, and involucels of linear acuminate bractlets; rays 1 to 4.5 cm. long; fruiting pedicels 4 to 7 mm. long; flowers yellow; fruit broadly oblong to nearly orbicular, about 8 mm. long, each carpel with 3 to 5 broad thin undulate crisped wings; oil tubes very small, 4 to 8 in the intervals, 8 to 12 on the commissural side; seed face with broad and shallow concavity.

Type locality, "Sandy grounds of the Wallawallah River, North-West coast of America," eastern Washington; collected by *Douglas.*

Dry ground, eastern Oregon and Washington, at the lower levels.

Specimens examined:

OREGON: John Day River, *Howell*, June, 1880.

WASHINGTON: Walla Walla region (type locality), *Nuttall;* loose volcanic soil, Falcon Valley, *Suksdorf*, June–July, 1883; Mount Adams, altitude 1,200 to 1,500 meters, *Suksdorf* 1201, August 10, 1885; dry ground, Yakima County (Prosser and Mount Adams) and Franklin County (Pasco), *Henderson* 380, May–August, 1892; *Sandberg & Leiberg* 230, in 1893.

2. **Pteryxia foeniculacea** Nutt. in Torr. & Gray Fl. **1**: 624. 1840.

Cymopterus foeniculaceus Torr. & Gray, l. c.

Resembling *P. terebinthina*, but not so robust, and lower, 1 to 3 dm. high; leaves greener, more finely dissected, and less rigid, the segments narrower and longer; fruit (not seen) said to be as in *P. terebinthina*, but the wings not undulate or scarcely so.

Type locality, "on rocks, Blue Mountains of Oregon;" collected by *Nuttall;* type in Herb. Philad. Acad.

In the mountains of eastern Oregon and Washington, and adjacent Idaho.

Specimens examined:

OREGON: Near Hoover Creek, Gilliam County, altitude 1,390 meters, *Leiberg* 134, June 1, 1894; near Strawberry Butte, Blue Mountains, altitude 2,475 meters, *Coville* 554, July 13, 1896; Logan Valley, Blue Mountains, *Cusick* 1657, June 20, 1897.

WASHINGTON: High ridges of Blue Mountains, Walla Walla County, *Piper* 2340, July 15, 1896; crevices of rocks on hillsides, Wawawai, Whitman County, *Elmer* 770, May, 1897; southeast Washington, *Horner* 224, July 17, 1897.

IDAHO: Cuddy Mountains, *Jones*, July 11, 1899.

3. **Pteryxia thapsoides** Nutt. in Torr. & Gray Fl. **1**: 625. 1840.

Cymopterus thapsoides Torr. & Gray Fl. **1**: 625. 1840.

Short caulescent, peduncles rising 3 dm. high and exceeding the leaves, glabrous; leaves with broad outline, finely dissected, the ultimate divisions small and linear; umbel with 6 to 10 rays, and involucels of linear or setaceous bractlets; rays in fruit 1 to 2.5 cm. long; pedicels 3 to 5 mm. long; flowers yellow; fruit oblong, 5 to 6 mm. long, with lateral wings about half as broad as body, and narrower dorsal and intermediate wings; oil tubes 3 to 5 in the intervals, 8 to 10 on the commissural side; seed much flattened.

Type locality, "rocky places in the Blue Mountains of Oregon;" collected by *Nuttall;* type in Herb. Philad. Acad.

Mountains of eastern Oregon.

Specimens examined:

OREGON: Type specimens as cited under type locality; "rocky subalpine ridges," *Cusick* 1396, July and August, 1886; Union, *Cusick* 1651, in 1897; "from the higher Wallawa Mountains," *Cusick* 2085, August 23, 1898.

4. **Pteryxia californica** C. & R., sp. nov.

Resembling *P. terebinthina*, but somewhat stouter; leaves with broad outline, strongly once or twice ternate then pinnate into larger, ovate to oblong, pinnately toothed or lobed, not so rigid segments; umbels with unequal rays 3 to 7.5 cm. long; fruit broadly oblong, about 6 mm. long, each carpel with 3 to 5 broad thin wings, neither undulate crisped nor thickened at insertion.

Type locality, Sisson, Siskiyou County, Cal.; collected by *H. E. Brown*, in 1897; type in U. S. Nat. Herb.

Mountains of northern California.

Specimens examined:

CALIFORNIA: Type specimen as cited under type locality; the following specimens are apparently the same: Sierra Nevada Mountains, *Lemmon*, in 1875; near Edgwood, Siskiyou County, *Lemmon* 45, June 27, 1889.

5. **Pteryxia petraea** (Jones) C. & R.

Cymopterus petraeus Jones, Contr. to Western Botany no. 8: 32. 1898.

Short caulescent, arising in dense clusters from a branched caudex, which is clothed with old leaf sheaths, 3 dm. high, the peduncles exceed-

g the leaves, glabrous; leaves with narrow and elongated outline, the mall pinnæ distant, either simple or pinnately divided into short narow segments; umbel with few very unequal rays, and involucels of near or setaceous bractlets; rays from nearly wanting to 4 cm. long; pedicels unequal, from nearly wanting to 5 mm. long; flowers yellow; fruit narrowly oblong, 4 to 6 mm. long, with lateral wings about half as broad as body, and narrower dorsal and intermediate wings or ribs; oil tubes 3 to 5 in the intervals, about 8 on the commissural side.

Type locality, "Palisade, Nevada;" collected by *M. E. Jones*, June 14, 1882; type in Herb. Jones, fragment in U. S. Nat. Herb.

From Nevada to Idaho and eastern Oregon.

Specimens examined:

OREGON: Cliffs of Steins Mountains, *Cusick* 1255, June, 1885, and same station, no. 1995, July 4, 1898; Alvord Desert, *Leiberg* 2426, June 30, 1896.

IDAHO: Shoshone Falls, *Palmer* 104, June 4, 1893; same station, *Henderson* 4597, July 25, 1897.

NEVADA: Type specimens as cited under type locality.

The Jones plant from Soda Springs, Cal., associated with this species, is probably to be referred to *P. californica*.

6. **Pteryxia calcarea** (Jones) C. & R.

Cymopterus calcareus Jones, Contr. to Western Botany no. 8: 32. 1898.

Short caulescent, giving rise to a tuft of leaves and longer peduncles (occasionally bearing a small leaf); leaves with the ultimate divisions linear; peduncles reaching a height of 2 to 3 dm.; umbel of unequal rays, no involucre, and involucels of small linear bractlets; rays 1 to 3.5 cm. long; pedicels 2 to 4 mm. long; flowers yellow; fruit oblong, 6 to 7 mm. long, the dorsal and intermediate wings sometimes reduced in breadth; oil tubes 3 to 5 in the intervals, 6 or more on the commissural side; seed face with broad and shallow concavity, but in immature specimens sometimes appearing plane.

Type locality, "Green River, Wyoming;" collected by *Jones*, June 23, 1896; type specimen in Herb. Jones, duplicate in U. S. Nat. Herb.

Southwestern Wyoming to eastern Nevada and Oregon.

Specimens examined:

WYOMING: Near Fort Bridger, *Porter*, July 8, 1873 (distributed as *Cymopterus foeniculaceus*); La Barge, Uinta County, *Stevenson*, June 21, 1894; Green River, *Jones*, June 23, 1896; Point of Rocks, *Nelson* 3083, June, 1897; Cokeville, Uinta County, *Nelson* 4643, June 11, 1898.

UTAH: Detroit, *Jones*, June, 1891.

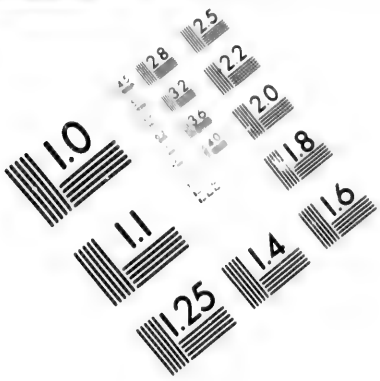
NEVADA: Dutch Mountain, *Jones*, June 12, 1891.

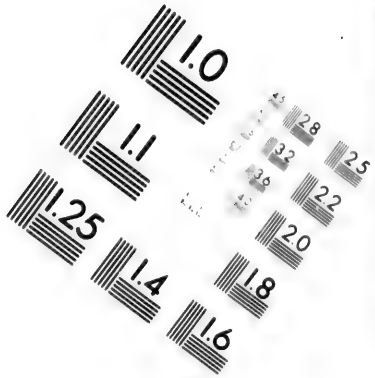
OREGON: Alvord Desert, *Leiberg* 2426, June 30, 1896.

7. **Pteryxia albiflora** Nutt. in Torr. & Gray Fl. 1: 625. 1840.

Cymopterus albiflorus Torr. & Gray Fl. 1: 625. 1840.

Low, very leafy at base; leaves pale, the ultimate segments divaricate and often 3-cleft, short, acute; peduncles slender, more or less spreading, 1 to 1.5 dm. high, considerably longer than the leaves; um-





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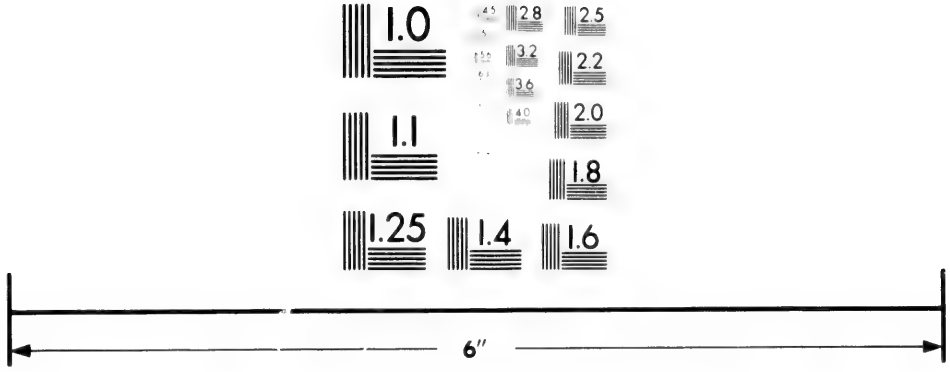

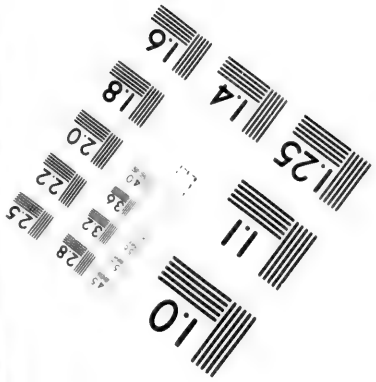

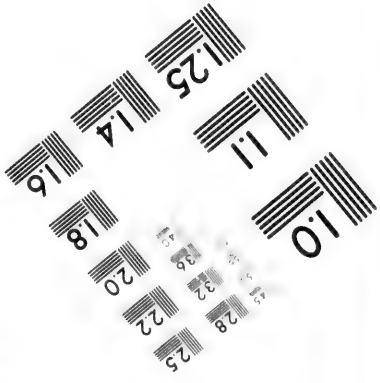

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bels with unequal rays, no involucre, and involucels of several linear bractlets; rays 4 to 12 mm. long; fruiting pedicels 3 mm. long; flowers white; fruit nearly orbicular, 4 mm. long, each carpel with usually 5 more or less undulate wings.

Type locality, "Hills of Bear River [southern Idaho], in the Rocky Mountain range;" collected by *Nuttall;* type in Herb. Philad. Acad.

In the Yellowstone National Park and adjacent Idaho, Wyoming, and Montana.

Specimens examined:

IDAHO: Type specimens as cited under type locality.

WYOMING: Northwestern Wyoming, *Rose* 533, September 7, 1893.

MONTANA: Near Red Lodge, *Rose* 48, July, 1893.

The specimens collected by Rose match exactly with Nuttall's type and with a Nuttall specimen in the Gray Herbarium.

51. **AULOSPERMUM** C. & R., gen. nov.

Calyx teeth evident. Fruit oblong to orbicular in outline, glabrous.

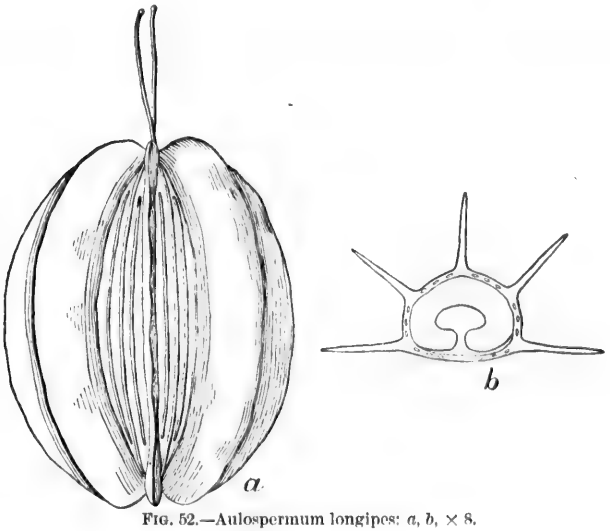


FIG. 52.—Aulospermum longipes: *a*, *b*, × 8.

Carpel with 3 to 5 usually broad wings, which are very thick at insertion or not at all, and with narrow or broad intervals. Stylopodium wanting. Oil tubes several in the intervals (solitary in *A. jonesii*), two or more on the commissural side. Seed not dorsally flattened or but slightly so, the face usually with a narrow and deep sulcus.

Caulescent or acaulescent plants, with more or less pinnately dissected leaves (or primary division ternate), mostly no involucre, involucels of small narrow bractlets, which are not at all hyaline, and white, yellow, or purple flowers. Name from *αὐλός*, *groove*, and

σπέρμα, *seed*, referring to the narrow and deep sulcus of the seed face.

Type species, *Cymopterus longipes* Watson, Bot. King Surv. 124. 1871.

A group of 9 species, ranging from Idaho to southern California in the Great Basin region.

The genus *Cymopterus*, with its thick corky wings and very flat seed with plane face, is very different from *Aulospermum*, whose closest affinity is with *Pteryxia*, from which it differs chiefly in its less flattened seed with usually narrow and deep sulcus, and in general in its leaf habit.

The cluster of pinnate leaves and peduncles borne at the summit of a more or less elongated stem, which is conspicuously sheathed at base.

Flowers yellow.

Involucre wanting ..... 1. *A. longipes.*

Involucre resembling the involucels ..... 2. *A. glaucum.*

Flowers white.

Scabrous puberulent ..... 3. *A. watsoni.*

Glabrous and glaucous ..... 4. *A. ibapense.*

Leaves clustered at base.

Wings much thickened at insertion.

Flowers greenish yellow; fruit 10 mm. long ..... 5. *A. panamintense.*

Flowers purple; fruit 6 to 8 mm. long.

Foliage glabrous ..... 6. *A. jonesii.*

Foliage with fine rough pubescence ..... 7. *A. cinerarium.*

Wings thin at insertion.

Leaves twice or thrice pinnate ..... 8. *A. purpureum.*

Leaves pinnate, with lobed or divided pinnæ ..... 9. *A. rosei.*

1. **Aulospermum longipes** (Watson) C. & R. FIG. 52.

Cymopterus longipes Watson, Bot. King Surv. 124. 1871.

Glabrous and glaucous; leaves pinnate to bipinnate, the ultimate segments oval and mucronulate; fruiting peduncles longer than the leaves, 10 to 25 cm. long; umbels 5 to 10-rayed, with no involucre, and involucels of subulate acuminate bractlets; rays 12 to 40 mm. long; pedicels 4 to 6 mm. long; fruit 6 to 8 mm. long, the 5 carpel wings broad and thin, somewhat unequal; oil tubes 3 in the intervals, 6 on the commissural side; seed face with deep and narrow sulcus, which broadens into a central cavity.

Type locality, "Wahsatch Mountains, near Salt Lake City [Utah], and on Antelope Island;" collected by *Watson*, no. 451, May, June, 1869; type in U. S. Nat. Herb.

Utah, northern Colorado, and southwestern Wyoming.

Specimens examined:

UTAH: Wahsatch Mountains, *Watson* 451, in 1869; *Captain Bishop* 25, in 1872; Juab, *Jones*, April 3, 1880; Fairview, *Jones* 5554*c*, June 30, 1894, and 5627*b*, July 13, 1894; Sandy, *Jones*, May 24, 1895; City Creek Canyon, *Jones*, April 4, 1896.

COLORADO: Yampa River, Routt County, *Alice Eastwood*, July 15, 1891.

WYOMING: Piedmont, Uinta County, *Nelson* 4574, 4575, June 7, 1898.

2. **Aulospermum glaucum** (Nutt.) C. & R.

Cymopterus glaucus Nutt. Jour. Philad. Acad. **7**: 28. 1834, not Watson in Bot. King Surv.

Phellopterus glaucus Nutt. in Torr. & Gray, Fl. **1**: 624. 1840.

Very near to *A. longipes*, but with more finely dissected leaves, involucres resembling the involucels, and the latter of larger and narrower bractlets.

Type locality, "on the borders of the Flat Head River, toward the sources of the Columbia;" collected by *Nuttall*; type in Herb. Philad. Acad. and Herb. Columbia Univ.

Idaho.

Specimens examined:

IDAHO: Near Sawtooth, *Evermann* 526, July 9, 1896; perhaps also Secesh Peak (?), *Henderson* 3180, July 2, 1895.

Various specimens have been referred here, but mostly erroneously. In 1871 Dr. Watson redescribed the species, basing his description upon his own specimens, collected in the mountains of Nevada. Although he states that his specimens accord exactly with Nuttall's type, a careful comparison of the two descriptions shows plainly that they are distinct though related species. Nuttall describes his plant as having smooth and glaucous leaves, yellow flowers, etc., while Watson says the leaf segments are more or less scabrous-puberulent and the flowers are white.

3. **Aulospermum watsoni** C. & R., sp. nov.

Cymopterus glaucus Watson in Bot. King Surv. 124. 1871. Not Nuttall.

More or less scabrous-puberulent; leaves tripinnate, the ultimate divisions crowded, linear-oblong, with revolute margins; peduncles at first short, elongating in fruit and exceeding the leaves; umbels 5 to 15-rayed, with an involucre of setaceous bracts or none, and involucels of linear acute bractlets; rays 8 to 24 mm. long; pedicels 4 to 6 mm. long; fruit 4 to 7 mm. long, the 2 to 5 carpel wings rather narrow; oil tubes 3 to 5 in the broad intervals, 6 to 8 on the commissural side; seed face with narrow sulcus.

Type locality, Battle Mountains, Nevada; collected by *Watson*, no. 450, June, July, 1868; type in U. S. Nat. Herb.

Mountains of Nevada.

Specimens examined:

NEVADA: Battle Mountains, cited under type locality; Palisades, *G. R. Vasey* 229, April, 1880.

4. **Aulospermum ibapense** (Jones) C. & R.

Cymopterus ibapensis Jones, Zoe **3**: 302. 1893.

Glaucous and glabrous; leaves tripinnate, the ultimate divisions crowded, oblong, obtuse, with revolute margins; peduncles in fruit exceeding the leaves; umbels with 6 to 8 rays about 1 cm. long in fruit and nearly equal; pedicels 4 mm. long; involucre none; involucels of linear acute bractlets; fruit 4 to 5 mm. long, and carpel with 5 broad thin wings somewhat thickened at insertion; oil tubes 3 in the intervals, 6 on the commissural side; seed face with narrow sulcus.

Type locality, "Deep Creek Valley," Utah; collected by *Jones*, June 6, 1891; type in Herb. Jones, duplicate in U. S. Nat. Herb.

Utah and Nevada.

Specimens examined:

UTAH: Type as cited.

NEVADA: Near Panaca, Lincoln County, *Vernon Bailey* 1974, May 18, 1891; Centerville, June 3, 1893, and Duck Creek, June 30, 1893, *Jones*.

5. **Aulospermum panamintense** C. & R.

Cymopterus panamintensis C. & R. Contr. Nat. Herb. **4**: 116. 1893.

Caudex stout, branching, clothed with an abundance of old leaf sheaths; flowering scape 7.5 to 10 cm. high, glabrous and purplish; leaves finely dissected, ternate, then once or twice pinnate; ultimate segments tipped with a slender bristle-like apiculation; involucre none; involucels small, gamophyllous, somewhat one-sided, purplish, cleft into ovate acuminate segments; rays (in flower) about 12 mm. long; pedicels short; flowers greenish-yellow; fruit 10 mm. long, glabrous, each carpel with 5 broad wings very thick at insertion; oil tubes 3 or 4 in the intervals, 4 on the commissural side; seed face deeply concave.

Type locality, "near Pete's garden, in Johnson Canyon, Panamint Mountains, California;" collected by *Coville*, no. 508, March 30, 1891; type in U. S. Nat. Herb.

Southern California.

Specimens examined:

CALIFORNIA: Panamint Mountains, *Coville* 508, in 1891; Argus Mountains, *Coville & Funston* 739, in 1891; Argus Mountains, *Purpus* 5393, in 1897.

As defined here the species is quite variable in its fruit. Coville's Panamint Mountains specimen is the type, with wings very thick at insertion, and hardly flattened seed with deeply concave face. The two other specimens referred here (*Coville & Funston* 739 and *Purpus* 5393) have the same seed section, but the wings are not so thickened at insertion, if at all. The material in hand, however, does not permit us to separate them. The following form seems to be worthy of separation as a variety, and is fairly intermediate in character between this genus and *Phellopterus*.

Aulospermum panamintense acutifolium C. & R., var. nov.

Leaves more open, with longer segments; fruit smaller, with wings not thickened at insertion; seed face variable, the concavity from broad and shallow to narrow and deep.

Type locality, Newberrys Springs, Mojave Desert, southern California; collected by *Mr.* and *Mrs. J. G. Lemmon*, May, 1884, and distributed as *Cymopterus terebinthinus;* type specimen in U. S. Nat. Herb.

Southern California.

Specimens examined:

CALIFORNIA: Type specimens as cited under type locality.

6. Aulospermum jonesii C. & R.

Cymopterus jonesii C. & R. Rev. N. Am. Umbell. 80. 1888.

Nearly acaulescent, glaucous and glabrous; leaves ternate, then pinnate to bipinnate, with ultimate segments rather broad and mucronate toothed; peduncles stout and longer than the leaves, 5 to 13 cm. high; umbels 5 to 12-rayed, with no involucre, and involucels of small lanceolate bractlets somewhat united at base; rays about 2.5 cm. long; pedicels 4 to 6 mm. long; flowers purple; fruit globose, 8 mm. in diameter, each carpel with 5 broad thin wings very thick at insertion; oil tubes solitary in the very narrow intervals, 2 on the commissural side; seed face with deep and narrow sulcus, which broadens into a central cavity.

Type locality, "Frisco," Beaver County, Utah, altitude 2,400 meters; collected by *Jones*, no. 1808, June 22, 1880; type in U. S. Nat. Herb.

Mountains of Utah.

Specimens examined:

UTAH: Type specimens as cited under type locality; Cove Creek, *Jones*, June 16, 1898.

7. Aulospermum cinerarium (Gray) C. & R.

Cymopterus cinerarius Gray, Proc. Am. Acad. **6**: 535. 1865.

Acaulescent, with subterranean creeping rootstock; peduncles (5 to 7.5 cm. high) and petioles glabrous; leaves somewhat cordate in outline, bipinnate with toothed segments, glaucous-cinereous with a fine rough pubescence; rays few, short or almost none; flowers purple; involucels of numerous united somewhat membranous long-acuminate segments; fruit 6 mm. long, the 5 wings of each carpel rather narrow and thick at insertion; oil tubes 3 in the intervals, several on the commissural side; seed face with narrow and deep concavity.

Type locality, "in volcanic ashes, on dry hills in the high Sierra Nevada, at Sonora Pass, and above Lake Mono," California, altitude 2,700 to 3,000 meters; collected by *Brewer;* type in Herb. Gray, fragments in U. S. Nat. Herb.

Only known from the type locality and from the original collection.

Specimens examined:

CALIFORNIA: Type specimens as cited under type locality.

8. Aulospermum purpureum (Watson) C. & R.

Cymopterus purpureus Watson, Am. Nat. **7**: 300. 1873.

Whole plant purplish, nearly acaulescent, glabrous; leaves broadly triangular in outline, twice to thrice pinnate, the segments coarsely mucronate-dentate; peduncles stout, exceeding the leaves; umbel unequally 8 to 12-rayed, with more or less elongated rays and pedicels, mostly no involucre, and involucels of lanceolate bractlets united near the base and nearly equaling the yellowish-purple flowers; fruit 8 to 10 mm. long, each carpel with 3 to 5 broad wings scarcely thickened at insertion; oil tubes 4 or 5 in the intervals, 8 on the commissural side; seed somewhat flattened, with broadly concave face.

Type locality, "New Mexico;" collected by *Palmer* in 1869; type in U. S. Herb. Gray, duplicates in U. S. Nat. Herb. Associated with the type in the original description is "northern Arizona," collected by *Mrs. E. P. Thompson*.

From Colorado and Utah to New Mexico and Arizona.

Specimens examined:

COLORADO: Durango, *Alice Eastwood*, June 10, 1890; Mancos, *Alice Eastwood*, June, 1891; Ridgway, *Bethel* 23, June 25, 1898.

NEW MEXICO: Type specimens as cited under type locality; Fort Wingate, *Marsh*, May 27, 1883.

ARIZONA: *Palmer*, in 1869; northern Arizona, *Mrs. Thompson*, in 1872; Pagumpa, altitude 1,200 meters, *Jones* 5082, 5092, April 20–21, 1894.

UTAH: *Captain Bishop*, in 1872; southern Utah, *Palmer* 177, in 1877; Silver Reef, Cedar City, canyon above Tropic and Emery, altitude 1,350 to 2,100 meters, *Jones* 5163, 5204, 5312, 5445, May 4–June 16, 1894; Price, Carbon County, *Jones*, June 24, 1898.

9. **Aulospermum rosei** Jones, in litt.

The stout peduncles erect or declined, 5 to 10 cm. long, somewhat longer than the prostrate leaves; leaves leathery, smooth, ovate to ovate-oblong, pinnate with lobed or divided pinnæ, the ultimate segments ovate to obovate, abruptly triangular-toothed or lobed; umbel with unequal rays, no involucre, and involucels of several lanceolate acute purplish bracts barely united at base and 4 mm. long; rays 4 to 12 mm. long, the outer ones the longer and spreading at right angles; fruiting pedicels 3 mm. long; flowers purple; fruit broadly oblong, 8 to 10 mm. long, each carpel with 3 to 5 broad thin wings slightly thickened at insertion; oil tubes small, several in the intervals; seed face concave.

Type locality, on slopes and mesas in alkaline clay soil among the red hills at Richfield, Utah; collected by *Jones*, June 18, 1898; type in U. S. Nat. Herb.

Utah.

Specimens examined:

UTAH: Near mouth of Salina Canyon, altitude 1,560 meters, *Jones* 5422, June 14, 1894; type specimens as cited under type locality; red hills at Elsinore, *Jones*, June 13, 1898.

52. CYMOPTERUS Raf. Journ. Phys. 89: 100. 1819.

Coloptera C. & R. Rev. N. Am. Umbell. 49. 1888.

Calyx teeth obsolete or evident. Fruit flattened dorsally, ovate, glabrous (puberulent at tip in *C. megacephalus*). Carpel with dorsal and intermediate ribs filiform or winged and approximate; lateral wings broad, very thick and corky, with neither nerves nor strengthening cells, coherent till maturity with those of the other carpel, forming a broad corky margin to the fruit usually thicker than the much-flattened fruit body, and in cross section showing a neck-like

connection. Stylopodium wanting. Oil tubes very small, 4 to 8 in the intervals (solitary in *C. globosus*), 8 to 14 on the commissural side (2 in *C. globosus*). Seed very flat, with plane face.

Dwarf acaulescent xerophytic plants, with small pinnate or bipinnate leaves, no involucre (except occasionally in *C. fendleri* and *C. newberryi*), usually foliaceous and conspicuous involucels, and white or yellow flowers.

Type species, *Selinum acaule* Pursh, Fl. **2**: Suppl. 732. 1814.

A genus of 7 species belonging to the arid regions of western United States, a single species extending into Canada.

The type of the genus is *C. acaulis* (*Selinum acaule* Pursh), but eventually it was made to include an aggregate of species very different from this type. In our Revision the genus *Coloptera* was established to include forms that could not be associated with *Cymopterus* as generally understood. Late Mr. Marcus E. Jones called attention to the fact that certain species retained in *Cymopterus* had the essential

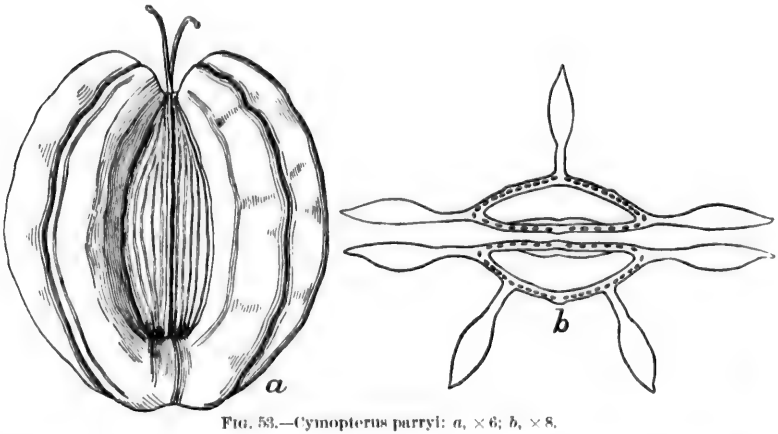


FIG. 53.—Cymopterus parryi: *a*, ×6; *b*, ×8.

characters of *Coloptera*, and a reexamination of old and new material has led us to the discovery that *Coloptera* represents the real genus *Cymopterus* as established by Rafinesque. Accordingly, the species of *Coloptera* and certain species of *Cymopterus* are herein set apart under the genus *Cymopterus* as established, and the other species of *Cymopterus*, those which have been commonly taken to represent the genus, are otherwise disposed of.

The genus, as here set forth, appears to be a very natural one. The forms all appear acaulescent, so far as the aerial habit is concerned, the cluster of leaves and flowering stems forming a rosette which seems to be usually prostrate. Beneath the surface the rosette arises from a slender stem which is more or less elongated, dependent upon the depth of the elongated and thick root. The whole structure is strongly xerophytic, the plants growing in dry, sandy, or gravelly soil.

The species are also remarkably restricted in range, being confined to the arid regions of New Mexico, Arizona, Colorado, Utah, and Nevada, with the single exception of *C. acaulis*, the type of the genus, which has an extensive northern and eastern range.

The leaf habit is quite uniform, the blades being in various states of pinnate division between simply pinnate and almost thrice pinnate, so that such terms as

pinnae," "segments," "ultimate divisions," etc., are purely arbitrary and difficult of application.

There is great variation in the development of dorsal and intermediate wings. The lateral are always present, and have the characteristic thick and corky structure, but the dorsal and intermediate ribs may all be winged, or only some of them may be winged, or they may bear no wings at all, and these variations may occur even in the same plant.

The presence of an involucre is also often a matter of uncertainty. In the usual case there is no involucre in the genus, but in some of the species a vestige in the form of a low sheath is apparent. Occasionally this sheath becomes toothed, and in *C. fendleri* and *C. newberryi* the teeth are sometimes produced into narrow bracts.

Two very natural sections of the genus are evident; the one with a compact head-like umbel and white flowers, the other with an open umbel and yellow flowers.

In the more technical characters *C. globosus* is the most exceptional species, with its solitary oil tubes and small involucellate bractlets; but in its combination of characters it can not be separated from the other species.

Umbels globose; flowers white; involucre wanting.
Oil tubes several in the intervals.
Fruit glabrous.
Involucels of linear entire bratlets; fruit orbicular, not exceeding 8 mm. in diameter.
Leaf segments small and narrow; fruit 6 to 8 mm. in diameter. 1. *C. acaulis.*
Leaf segments shorter and more obtuse; fruit larger ..... 2. *C. parryi.*
Involucels of broad more or less cleft bractlets; fruit broadly oblong, 10 mm. long ..... 3. *C. leibergii.*
Fruit puberulent at apex ..... 4. *C. megacephalus.*
Oil tubes solitary in the intervals ..... 5. *C. globosus.*
Umbels open; flowers yellow; a vestige of an involucre and sometimes bracts.
Leaf segments narrow ..... 6. *C. fendleri.*
Leaf segments broad ..... 7. *C. newberryi.*

1. **Cymopterus acaulis** (Pursh) Rydberg, Bot. Surv. Neb. **3**: 38. 1894.

Selinum acaule Pursh, Fl. **2**: 732. 1814.
Thapsia glomerata Nutt. Gen. **1**: 184. 1818.
Cymopterus glomeratus DC. Prodr. **4**: 204. 1830.
Cymopterus campestris Torr. & Gray, Fl. **1**: 624. 1840.

Low (7 to 20 cm.) and glabrous, with a short caudex bearing a cluster of leaves and peduncles; leaves merging from pinnate to bipinnate; ultimate segments mostly small and narrow; peduncles mostly shorter than the leaves; rays and pedicels very short, making a rather compact cluster; involucel of linear and entire more or less united foliose bractlets; flowers white; fruit 6 to 8 mm. in diameter, with 3 to 5 broad wings on each carpel; oil tubes small, 4 to 8 in the intervals (or double the number where a rib has been suppressed), 8 to 14 on the commissural side.

Type locality, "in upper Louisiana;" collected by *Bradbury;* type specimen said by Pursh to be in Herb. Bradbury.

Dry plains from Arkansas to Colorado on the south, and extending northward into the great plains of Canada.

Specimens examined:

ARKANSAS: Fort Lyon, *Palmer*, April 9, 1863.

COLORADO: Plains, *Hall & Harbour* 211, in 1862; near Denver, *Wolf*, June, 1873; Pueblo, *Hicks* 157, June, 1890; Denver, *Alice Eastwood*, in 1891; dry plains, *Crandall*, April 28, 1894; Larimer County, *Baker* 3034, May 1, 1895; Fort Collins, *Coleen* 184, April 29, 1891; New Windsor, *Osterhout*, May, 1895; near Denver, *Holzinger* 6, 7, 8, 11, May 25–June 10, 1896.

WYOMING: Cheyenne, *Havard*, in 1893; Laramie, *A. & E. Nelson* 6829, May 31, 1899.

SOUTH DAKOTA: Black Hills, *Rydberg* 727, May 27, 1892; Smithville, *V. Bailey* 12, June 1, 1894.

MONTANA: Bluffs of the Missouri, *Havard*, May, 1879; Great Falls, *Williams*, June, 1887 and 1891.

ASSINIBOIA: Medicine Hat, *Macoun* 4966, May 31, 1894.

2. **Cymopterus parryi** (C. & R.) Jones, Zoe **4**: 48. 1893. FIG. 53.

Coloptera parryi C. & R. Rev. N. Am. Umbell. 50. 1888.

Resembling *C. acaulis*, but the leaf segments shorter and more obtuse, the fruit somewhat larger with thicker lateral wings, the bractlets somewhat different, and said to come from the mountains instead of the plains.

Type locality, "Little Sandy, northwest Wyoming;" collected by *Parry* in 1873; type in Herb. Gray.

Western Wyoming and Montana.

Specimens examined:

WYOMING: Type specimens as cited under type locality; Granger, *Jones*, June 24, 1896; same station, *Aven Nelson* 4626, June 10, 1898.

MONTANA: Gallatin County, *Tweedy*, May, 1888.

3. **Cymopterus leibergii** C. & R., sp. nov.

Resembling *C. acaulis*, but somewhat stouter; leaves tripinnate, the ultimate segments short and mostly obtuse; peduncles as long as the leaves or longer; involucels of broad somewhat membranaceous bractlets more or less 3-cleft at the apex; fruit broadly oblong, 10 mm. long.

Type locality, Malheur Valley, near Harper Ranch, Oregon; collected by *Leiberg*, no. 2253, June 12, 1896; type in U. S. Nat. Herb.

Oregon and Idaho.

Specimens examined:

OREGON: Type specimens as cited under type locality.

IDAHO: Blue Lakes, *Palmer* 67, June 3, 1893.

4. **Cymopterus megacephalus** Jones, Zoe **2**: 14. 1891.

Low (5 to 15 cm.) and glabrous, a cluster of prostrate leaves and peduncles arising from a thick root; leaves shorter than the fruiting peduncles, pinnate or bipinnate, with narrowly oblong pinnatifid segments; ultimate divisions rather narrow and bluntly toothed; rays and pedicels obsolete, the white flowers and fruit being in dense globose heads, and the bractlets of the involucel wedge shaped, more or less united at base and toothed at apex; fruit 6 to 8 mm. long, obovate,

puberulent at tip, the 3 to 5 thick carpel wings usually unequal, becoming narrower toward the base of the fruit; oil tubes several in the intervals, 8 or more on the commissural side.

Type locality, "Little Colorado, northern Arizona, growing in gravel;" collected by *Jones;* type specimen in Herb. Jones, duplicate in U. S. Nat. Herb.

Northern Arizona and probably in Nevada.

Specimens examined:

ARIZONA: Little Colorado, *Jones*, June 10, 1890.

NEVADA: *Shockley*, April, 1886, seems to be this species, but is not in fruit.

Apt to be confused with *C. globosus*, which it very much resembles in general habit, but is distinct in its more finely dissected leaves with narrower segments and blunter teeth, larger and toothed involucellate bractlets, puberulent fruit, and numerous oil tubes.

5. **Cymopterus globosus** Watson, Proc. Am. Acad. **11**: 141. 1876.

Cymopterus montanus globosus Watson, Bot. King Surv. 124. 1871.

Low (5 to 10 cm.) and glabrous, the cluster of few leaves and peduncles springing from a slender subterranean stem; leaves glaucous, pinnate or bipinnate, with broadly oblong pinnatifid segments; ultimate divisions rather broad, more or less cuspidate-toothed; rays and pedicels obsolete, the white flowers and fruit being in dense globose heads, and the bractlets of the involucel small and linear, hidden among the flowers of the dense cluster; fruit 6 to 8 mm. long, obovate, the 5 thick carpel wings approximately equal, becoming narrower toward the base of the fruit; oil tubes solitary in the intervals, 2 on the commissural side and a small one in each wing.

Type locality, "Carson Valley and on the Virginia and Trinity Mountains, Nevada, altitude 4,500 to 7,000 feet;" collected by *Watson*, no. 449; type specimens in U. S. Nat. Herb.

Valleys in the mountains of northern Nevada.

Specimens examined:

NEVADA: Near Carson City, altitude 1,500 meters, *Watson* 449 except fruit, April, 1868; near Empire City, *Jones* 3885, May 20, 1882.

A very rare species, having been collected but two or three times.

6. **Cymopterus fendleri** Gray, Pl. Fendl. 56. 1849.

Cymopterus decipiens Jones, Zoe **2**: 246. 1891.

Low (5 to 10 cm.) and glabrous, the cluster of leaves and peduncles springing from a slender subterranean stem which arises from an elongated thick root; leaves usually exceeding the peduncles, 2 to 3-pinnate; pinnae and segments 5 or 7, oblong and incised; umbels with few and unequal rays and yellow flowers, sterile flowers with longer pedicels than the fertile; involucre represented by a short sheath whose teeth are occasionally prolonged into small linear bracts, and involucels of bractlets united at base and exceeding the flowers; fruit

oblong, 6 to 10 mm. long; each carpel with 3 or 4 wings which are thin at the margin and also next to the body; oil tubes several in the intervals, 4 to 8 on the commissural side.

Type locality, "Gravelly hills, Santa Fe," N. Mex.; collected by *Fendler*, no. 274; type specimen in U. S. Nat. Herb.

Gravelly soil, New Mexico, Colorado, and Utah.

Specimens examined:

NEW MEXICO: Hills near Santa Fe, *Fendler* 274, in 1847; same station, *A. A.* & *E. Gertrude Heller* 3539, May 15, 1897.

COLORADO: Westwater, *Jones*, May, 1890; Mancos, *Alice Eastwood*, May and June, 1890 and 1891; Grand Junction, *Crandall*, May 28, 1894; same station, *Jones*, May 22, 1895.

UTAH: Cisco, *Jones*, May 2, 1890, type of *C. decipiens* Jones (in Herb. Jones, duplicate in U. S. Nat. Herb.); Green River, *Jones*, May 22, 1895.

This species differs from the preceding species of *Cymopterus* in the presence of what may be regarded as a vestige of an involucre, in the form of a distinct but short sheath, whose teeth are occasionally prolonged into small narrow bracts.

7. Cymopterus newberryi (Watson) Jones, Zoe **4**: 47. 1893.

Peucedanum newberryi Watson, Am. Nat. **7**: 301. 1873.
Ferula newberryi Watson, Proc. Am. Acad. **11**: 145. 1876.
Coloptera newberryi C. & R. Rev. N. Am. Umbell. 49. 1888.
Coloptera jonesii C. & R. Rev. N. Am. Umbell. 50. 1888.
Cymopterus newberryi alatus Jones, Zoe **4**: 47. 1893.
Cymopterus newberryi jonesii Jones, Proc. Cal. Acad. II. **5**: 684. 1895.

Often more robust than the other species (5 to 18 cm. high), but with the same habit; leaves shorter than the peduncles, pinnately 3 to 5-foliolate or simply lobed, lobes and leaflets broad; terminal leaflet 3-lobed, the lower mostly 2-lobed, all the lobes sparingly incised; umbel unequally 4 to 13-rayed, with yellow flowers, and conspicuous involucels of more or less unequal oblong to ovate foliaceous bractlets; fruit sessile or nearly so, 6 to 8 mm. long, with very thick lateral wings and dorsal and intermediate ribs filiform or winged; oil tubes 4 to 8 in the intervals, 8 to 10 on the commissural side.

Type locality (*Peucedanum newberryi* Watson), "New Mexico; northern Arizona;" collected by *Newberry* and *Mrs. E. P. Thompson;* type in Herb. Gray.

New Mexico, northern Arizona, Utah, and Colorado.

Specimens examined:

UTAH: Southern Utah, *Palmer* 180, in 1877; Milford, *Jones* 1792 (type of *Coloptera jonesii* C. & R.), June 18, 1880; Laverken (5196L) and Silver Reef (5163*a*), *Jones*, May, 1894; Moab, *Alice Eastwood* 3, May, 1892.

COLORADO: Westwater, *Jones*, May, 1890.

Since our description of *Coloptera jonesii* (Rev. N. Am. Umbell.) further material makes it evident that the appearance of wings on the dorsal and intermediate ribs is very inconstant. In fact, these ribs are sometimes either with or without wings on the same plant. In view of this fact the principal character for *C. jonesii* breaks down, and it is merged with *Cymopterus newberryi*, as above.

Cymopterus lapidosus Jones, Contrib. Western Botany no. 8:31. 1898. Fig. 54.

Pencedanum lapidosum Jones, Zoe **2**:246. 1891.

Glabrous; leaves and peduncles borne in a cluster at the summit of a more or less elongated subterranean stem arising from a long branching root; leaves 5 to 10 cm. long, pinnate to bipinnate, the pinnae rather crowded, ovate, lower ones incised, upper ones entire; peduncles sometimes shorter than the leaves, or becoming 1.5 to 2 cm. high, bearing a nearly equally rayed umbel, with involucels of several linear bractlets; rays 1 to 2 cm. long; pedicels 4 mm. long; flowers white; fruit oblong, glabrous, 6 to 7 mm. long, 2 to 2.5 mm. broad, with wings half as broad as body or less, and prominent dorsal and intermediate ribs (more or less winged); oil tubes several in the intervals.

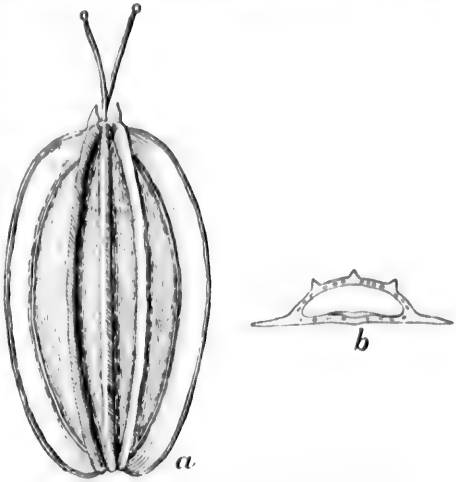


Fig. 54.—Cymopterus lapidosus: *a*, *b*, ×8.

Type locality not given, but label states "Echo City, Summit County, Utah;" collected by *Jones*, May 7, 1890; type in Herb. Jones, duplicate in U. S. Nat. Herb.

Northwestern Utah and adjacent Wyoming.

Specimens examined:

Utah: Type specimens as cited under type locality.

Wyoming: Granger, Sweetwater County, *Jones*, June 24, 1896.

Mr. Jones describes this species as "a delicate, heavy-scented plant, growing under rocks like ferns, spreading flat on the ground, or erect in more exposed situations."

The relationship of this species is very doubtful, and until it has been more carefully studied it must remain under *Cymopterus*, although it is not congeneric with the above species. It may represent a new generic type.

Cymopterus nivalis Watson is a poorly known species. For a statement concerning it, see under *Pseudocymopterus*.

53. RHYSOPTERUS C. & R., gen. nov.

Calyx teeth evident. Fruit flattened laterally, nearly orbicular in outline, glabrous. Carpel flattened dorsally, boat shaped (margins and ends incurved), with 5 equal prominent corky obtuse ribs, which are wing like and very much wrinkled when young. Carpophore wanting (at least not showing in ripe fruit). Stylopodium wanting. Oil tubes small, solitary in the intervals, 2 on the commissural side. Seed boat-shaped, with a broad and deep sulcus.

Low dry ground glabrous plants, with leaves and peduncles in a cluster at the summit of a short slender stem (more or less subterranean) arising from a very thick elongated root, once or twice pinnate thick or coriaceous leaves with broad segments, no involucre, involucels of rather conspicuous bractlets, and white flowers. Name from *ῥυσός, wrinkled*, and *πτερόν, wing*.

Type species, *Rhysopterus plurijugus* C. & R.

A genus of 3 species, belonging to the arid regions of Utah, Nevada, and eastern Oregon.

The genus resembles *Cymopterus*, and especially *C. newberryi* in habit, but has a very different fruit, which most closely resembles that of *Oreoxis*, but the latter has sharper ribs, flat-faced carpels, and very different foliage and habitat.

Primary leaf divisions 3, terminal largest, laterals deeply 2-lobed.

Umbels several, forming a compact cluster ..... 1. *R. plurijugus*.
Umbels usually solitary ..... 2. *R. jonesii*.

Primary leaf divisions 5, basal pair largest and pinnately 3 to 5-cleft .. 3. *R. corrugatus*.

1. **Rhysopterus plurijugus** C. & R., sp. nov. FIG. 55.

Leaves coriaceous, 2 to 3 cm. long, on very short petioles, with broadly oblong or ovate and obtuse outline; leaflets 3, the laterals deeply 2-lobed, the terminal one much larger and usually 3-lobed, all the lobes somewhat cleft and coarsely crenate-mucronate-toothed; peduncles shorter than the leaves; umbels several, forming a compact cluster, with involucels of ovate acuminate bractlets distinct nearly to the base; rays very stout, 8 to 10 mm. long; fruiting pedicels 1 to 3 mm. long, shorter than those of the sterile flowers; fruit 3 mm. long, an accessory pair of corky ribs on the commissural side of the laterals, giving the appearance of a 7-ribbed carpel.

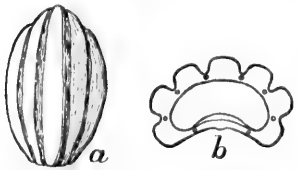


FIG. 55.—Rhysopterus plurijugus: *a*, × 6; *b*, × 8.

Type locality, Malheur Valley, near Harper ranch, Oregon, altitude 1,000 meters; collected by *Leiberg*, no. 2240, June 10, 1896; type in U. S. Nat. Herb.

Only known from the type locality.

Specimens examined:

OREGON: Type specimen as cited under type locality.

2. **Rhysopterus jonesii** C. & R., sp. nov.

Resembling *R. plurijugus*, but leaves somewhat fleshy, with longer petioles, and the teeth not mucronate; umbels solitary and on longer peduncles.

Type locality, Juab, Utah, altitude 1,200 meters; collected by *Jones*, no. 1691, April 30, 1880; type in U. S. Nat. Herb.

Only known from the type locality.

Specimens examined:

UTAH: Type specimen as cited under type locality.

3. **Rhysopterus corrugatus** (Jones) C. & R.

Cymopterus corrugatus Jones, Am. Nat. **17**: 973. 1883.

Leaves becoming 7 cm. long, with a more oblong outline, and more dissected: primary divisions or leaflets 5, basal pair the largest, ovate, pinnately 3 to 5-cleft, the ultimate divisions cleft and sharply toothed; umbels usually solitary and on longer peduncles, with involucels of ovate bractlets often cleft at apex into 3 long linear lobes.

Type locality, "Rose Creek," near Humboldt Lake, Nevada; collected by *Jones*, no. 3886, June 17, 1882; type in Herb. Jones, duplicate in U. S. Nat. Herb.

Only known from the type locality.

Specimens examined:

NEVADA: Type specimens as cited under type locality.

54. **PSEUDOCYMOPTERUS** C. & R. Rev. N. Am. Umbell. 20 and 74. 1888.

Calyx teeth evident. Fruit oblong, glabrous. Carpel with very prominent and acute (sometimes narrowly winged) dorsal and intermediate ribs, and rather broad and thickish lateral wings (sometimes not much more prominent than the dorsals and intermediates), which are distinct from those of the other carpel. Stylopodium wanting. Oil tubes 1 to 4 in the intervals, 2 to 8 on the commissural side. Seed more or less flattened, with plane face (except in *P. bipinnatus*).

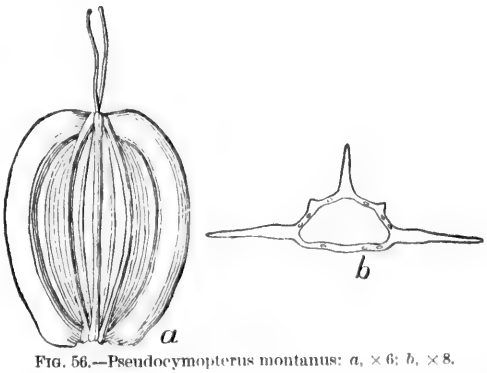


FIG. 56.—Pseudocymopterus montanus: *a*, ×6; *b*, ×8.

Caulescent or acaulescent plants, with bipinnate leaves, no involucre (very rarely a bract or two), involucels of mostly linear bractlets, and variously colored flowers.

Type species, *Thaspium(?) montanum* Gray, Pl. Fendl. 57. 1849.

A group of 4 species, belonging chiefly to the Rocky Mountains and extending from New Mexico and Arizona to Montana and eastern Oregon.

Caulescent and slender; flowers yellow or purple ..... 1. *P. montanus.*
Acaulescent and cespitose; flowers white or yellow.
  Leaves on long petioles and with pungently acute segments ..... 2. *P. anisatus.*
  Leaves on short petioles, very pale or glaucous, not so pungent.
    Peduncles 3 to 5 cm. long ..... 3. *P. hendersoni.*
    Peduncles 10 to 20 cm. long ..... 4. *P. bipinnatus.*

1. **Pseudocymopterus montanus** (Gray) C. & R. Rev. N. Am. Umbell. 74. 1888. FIG. 56.

Thaspium(?) montanum Gray, Pl. Fendl. 57. 1849.
Ligusticum montanum Benth. & Hook. in Watson Bibliog. Index, 426. 1878.

Stem erect, slender, 3 to 6 dm. high, more or less leafy, glabrous except at the base of the umbel or on the rays; the bipinnate leaves mostly with broad outline; leaflets exceedingly variable, variously cut or entire; umbel 6 to 12-rayed, with involucels of linear or setaceous bractlets longer than the yellow flowers; rays 12 to 30 mm. long; pedicels about 2 mm. long; fruit broadly oblong, 4 to 5 mm. long, with lateral wings almost as broad as body, the dorsal and intermediates very variable (either ribbed or narrowly winged); oil tubes 1 to 4 in the intervals, 4 to 6 on the commissural side; seed much flattened.

Type locality, "Sunny declivities, at the foot of mountains, along Santa Fe Creek," New Mexico; collected by *Fendler*, no. 276; type in U. S. Nat. Herb.

From New Mexico and Arizona to Utah, Colorado, and western Wyoming.

Specimens examined:

NEW MEXICO: Type specimens as cited under type locality; Santa Fe Canyon, near Santa Fe (type locality), altitude 2,400 meters, *A. A. & E. Gertrude Heller* 3651, June 2, 1897; White Mountains, Lincoln County, altitude 2,250 meters, *Wooton* 350, August 15, 1897.

ARIZONA: Flagstaff, *Jones* 4016, August 7, 1884; same station, *Tracy* 236, June 24, 1887; about Mormon Lake, altitude 1,800 meters, *MacDougal* 106, June 12, 1898.

UTAH: *Ward* 330, 494, in 1875; Marysvale and Panguitch Lake, altitude 2,520 to 2,670 meters, *Jones* 5367, 6015, June and September, 1894.

COLORADO: Halfmoon Creek, Union Creek Pass (altitude 3,600 meters), Lake Creek, and Clear Creek, *Wolf* 716, 719, 720, 724, June–August, 1873; North Park, *Sheldon* 124, July 28, 1884; Durango, *Alice Eastwood*, June 7, 1890; Cameron Pass, altitude 3,600 meters, *Crandall*, September 1, 1890; Williams Canyon, altitude 2,100 meters, *Crandall*, May 27, 1892; Middle Park, *Beardslee* 125, August, 1892; Rabbit Ear Range, altitude 2,940 meters, *Crandall*, July 20, 1894; Telluride, altitude 3,240 meters, *Tweedy* 204, August 25, 1894; Leadville, *Osterhout*, June, 1895; Gore Mountains, altitude 2,850 meters, *Bethel*, August, 1895; Leadville and Breckenridge, altitude 3,000 to 3,150 meters, *Holzinger* 1, 2, May–June, 1896; Cameron Pass, altitude 3,000 meters, *Baker* 5, July 13, 1896; Pikes Peak, altitude 2,520 meters, *Knowlton* 3, June 14, 1896; hills above Mancos (altitude 2,400 to 2,700 meters), and Cumberland Basin, La Plata Mountains (altitude 3,690 meters), *Baker, Earle & Tracy* 137, 619, June–July, 1898.

WYOMING: Saw Mill Creek and Laramie Hills, *Nelson* 1238, May, 1894 and 1895; Madison River, Yellowstone Park, *A. & E. Nelson* 5496, June 23, 1899.

Extremely variable, but the two following forms seem to be worthy of varietal rank:

Pseudocymopterus montanus tenuifolius (Gray) C. & R., l. c. 75.

Thaspium (?) montanum tenuifolium Gray, Pl. Wright **2**: 65. 1853.
Ligusticum montanum tenuifolium Watson, Bibl. Index 426. 1878.

Often larger and more branching, with narrowly linear leaflets 1 to 4 cm. long.

Type locality, "Hillsides of Coppermine Creek, New Mexico;" collected by *Wright*, no. 1107, in 1851; type in Herb. Gray, duplicate in U. S. Nat. Herb.

From Colorado to New Mexico and Arizona.

Specimens examined:

COLORADO: La Veta Pass, *Vasey*, in 1884; Grays Peak, *Patterson* 42, July–August, 1885; Table Rock, altitude 2,250 meters, *Breninger*, June 6, 1891; foothills, altitude 1,650 to 1,950 meters, *Crandall*, May 12–27, 1893; Leadville, altitude 3,300 meters, *Bethel*, July 1, 1894; near Como, altitude 3,000 meters, *Crandall*, August 1, 1895; Pikes Peak, altitude 2,100 to 3,000 meters, *Holzinger* 10, 1896.

NEW MEXICO: Type specimens as cited under type locality; Mogollon Mountains, *Rusby* 148½, August, 1881; Pinos Altos, *Nealley* 46, June, 1891; Big Hatchet Mountains, *Mearns* 39, May 17, 1892.

ARIZONA: *Palmer*, in 1869; Willow Spring, *Rothrock* 253, July, 1874; San Francisco Mountain, *Knowlton* 120, August 26, 1889; Willow Spring, *Palmer* 500, June 10–20, 1890; Fort Huachuca, *Wilcox* 481, September, 1894; Flagstaff, altitude 2,100 meters, *MacDougal* 256, July 8, 1898.

Pseudocymopterus montanus purpureus C. & R., l. c.

Short caulescent, with rather weak ascending peduncles (7.5 to 15 cm. long), and purple flowers.

Type locality, "Fort Humphreys, Arizona;" collected by *Rusby*, no. 632, July, 1883; type in U. S. Nat. Herb.

Utah, Arizona, and New Mexico, and extending into Mexico.

Specimens examined:

UTAH: Mount Ellen, Henry Mountains (altitude 3,300 meters), Bromide Pass (altitude 3,000 meters), Fish Lake (altitude 3,000 meters), and Marysvale (altitude 3,450 meters), *Jones* 5679, 5695, 5717, 5770, 5893, July 25–August 23, 1894.

ARIZONA: *Palmer*, July 4, 1869; Flagstaff and Mount Humphreys, *Rusby* 631, 632, July–August, 1883; Flagstaff, *Lemmon*, September, 1884; same station, *Jones*, August 13, 1884; San Francisco Mountain, *Knowlton* 74, 81, August 23, 1889; Cheno Valley, *Toumey* 192, June 24, 1892; Buckskin Mountains, altitude 2,700 meters, *Jones* 6056, September 19, 1894; Walnut Canyon and Humphreys Peak, altitude 2,100 to 3,600 meters, *MacDougal* 332, 395, July–August, 1898.

NEW MEXICO: Bear Mountains, *Rusby* 147½, May, 1881.

2. **Pseudocymopterus anisatus** (Gray) C. & R., l. c. 1888.

Cymopterus (?) *anisatus* Gray, Proc. Philad. Acad. 1862: 63. 1863.

Acaulescent, cespitose from a much branched caudex, which is more or less covered with the remains of old leaves; leaves on long petioles, narrow, somewhat rigid, pinnate, and the leaflets pinnately parted into linear (sometimes broader) pungently acute segments; peduncles 1 to 3 dm. high, exceeding the leaves; umbel unequally 5 to 12-rayed, with involucels of linear-subulate (sometimes lobed) bractlets exceeding the

white or yellow flowers; rays 1 to 7.5 cm. long; pedicels 2 to 6 mm. long; fruit about 4 mm. long, the carpel irregularly 2 to 5-winged; oil tubes 1 to 3 in the intervals, 2 to 4 on the commissural side; seed face plane.

Type locality, "Dry hills in the middle mountains," Colorado; collected by *Hall & Harbour*, no. 222, in 1862; type in Herb. Gray, duplicate in U. S. Nat. Herb.

Mountains of Colorado, Utah, and Nevada, northward to northwestern Wyoming and Oregon.

Specimens examined:

COLORADO: Type specimens as cited under type locality; *Scoville*, in 1869; El Paso County, *Letterman* 220, August 3, 1884; Grays Peak, *Patterson* 40, July–August, 1885; North Cheyenne Canyon, El Paso County, altitude 2,550 meters, August 6, 1892; Red Cliff, altitude 2,400 meters, *Bethel*, July 2, 1894.

WYOMING: Fort Steele, *Nelson* 4803, June 18, 1898; Teton Mountains, *A. & E. Nelson* 6507, August 16, 1899.

UTAH: Alta, Wasatch Mountains, altitude 3,750 meters, *Jones* 5677, July 25, 1894.

NEVADA: East Humboldt Mountains, altitude 2,400 meters, *Watson* 453, August, 1868.

3. **Pseudocymopterus hendersoni** C. & R., sp. nov.

Acaulescent, cespitose, the caudex clothed with old leaf sheaths and petioles; leaves on short petioles, very pale, narrow in outline, pinnate; the pinnae somewhat ovate in outline, but deeply cleft into 3 to 5 linear entire segments; peduncles longer than leaves, 3 to 5 cm. long; umbels small, compact; rays 4 to 6, 3 to 5 mm. long; pedicels short; involucel of linear entire bractlets; fruit immature.

Type locality, mountain peak near source of Mill Creek, Idaho, altitude 3,740 meters; collected by *Henderson*, no. 4068, August 21, 1895; type in U. S. Nat. Herb.

Mountains of Idaho.

Specimens examined:

IDAHO: Type specimens as cited under type locality.

This species is nearest *P. anisatus*, but has very different foliage.

4. **Pseudocymopterus bipinnatus** (Watson) C. & R. Rev. N. Am. Umbell. 75. 1888.

Cymopterus bipinnatus Watson, Proc. Am. Acad. **20**: 368. 1885.

Cespitose, the short branches of the rootstock covered with the crowded remains of dead leaves, glaucous, puberulent; leaves pinnate with few pairs of short segments, which are pinnately divided into short linear lobes; peduncles 1 to 2 dm. high, much exceeding the leaves; rays 2 to 8 mm. long; involucels of conspicuous linear-lanceolate or broader bractlets, with hyaline margins, and more or less united at base; flowers white; fruit nearly sessile, ovoid, 3 to 4 mm. long, moderately flattened dorsally, the 5 thickish carpel wings equal and narrow (often being but very prominent acute ribs); oil tubes 3 or 4

in the intervals, 6 to 8 on the commissural side; seed face slightly concave.

Type locality, "in the Rocky Mountains, south of Virginia City, Montana;" collected by *Hayden*, in 1871 (distributed as *Cymopterus fasciculatus*); type in Herb. Gray. Also associated with type in original description; "on a ridge above Bannock City, southwest Montana," *Watson*, in 1880; "on Mount Helena, Montana," *Canby*, in 1883.

In the mountains of western Wyoming, Montana, Idaho, and Oregon.

Specimens examined:

WYOMING: Monida, *A. & E. Nelson* 5411, June 16, 1899.

MONTANA: Ridges above Bannock, altitude 2,100 meters, *Watson* 158, July 19, 1880; Mount Helena, *Canby* 148, July 6, 1883; same station, *Williams* 516, April 30, 1886; same station, *Kelsey* 133, May–June, 1887 and 1888; *Tweedy*, June, 1888; Pole Creek and Cedar Mountain, *Rydberg* 4628, 4629, 4630, July 4–16, 1897.

IDAHO: Mountain top near Challis, altitude 2,400 meters, *Henderson* 3810, August 3, 1895.

OREGON: Steins Mountains, *Cusick* 2040*a*, July 15, 1898.

Kelsey 133 of 1887 and *Tweedy* of 1888 differ from the ordinary forms of the species in having glabrous leaves, with narrow and longer leaf segments.

Cymopterus nivalis Watson, Bot. King Surv. 123. 1871, collected by *Watson* (no. 148), has not been collected since, and on account of absence of fruit and general insufficiency of material can not be definitely placed. The testimony at hand, however, suggests that it may be congeneric with *Pseudocymopterus bipinnatus*. The type locality is given as "East Humboldt Mountains, [N.] Nevada, 9,000 to 10,000 feet altitude," the material being collected July, 1868.

55. **POLYTAENIA** DC. Coll. Mém. 5: 53. 1829.

Calyx teeth conspicuous. Fruit obovate to oval, much flattened dorsally, glabrous. Carpel with dorsal and intermediate ribs small or obscure in the depressed often corky back; laterals forming broad and usually thick corky wings closely contiguous to those of the other carpel and forming the margin of the fruit. Stylopodium wanting. Oil tubes 12 to 18 about the seed (4 to 6 on the commissural side) and many scattered through the thick corky pericarp, which also contains 5 small bundles of strengthening cells. Seed section oval or much flattened.

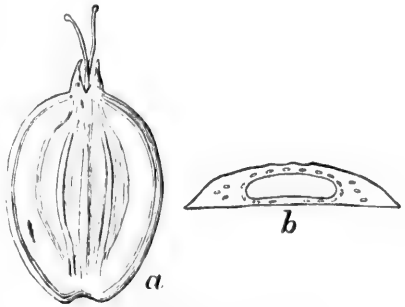


FIG. 57.—Polytaenia nuttallii: *a*, *b*, ×4.

Perennial mostly glabrous herbs, with twice pinnate leaves, no involucre, involucels of narrow bractlets, and bright yellow flowers.

A monotypic genus of the Mississippi Basin.

1. **Polytaenia nuttallii** DC. Coll. Mém. **5**: 54. pl. 13. 1829. Fig. 57.

Plants 6 to 9 dm. high, mostly glabrous except the pubescent pedicels and involucels; leaf segments cuneate and incised; upper leaves opposite and 3-cleft; umbel 6 to 12-rayed; rays about 2.5 cm. long, pedicels 2 to 4 mm. long; fruit 6 to 10 mm. long; dorsal and intermediate ribs obsolete and oil tubes superficially indistinct; lateral wings very thick, leaving the body more or less depressed.

Type locality, "territoire de l'Arkansa;" collected by *Nuttall* in 1825; type in Herb. DC., duplicate in Herb. Philad. Acad.

Dry soil, from southern Michigan and Wisconsin to Alabama and Texas.

Specimens examined:

WISCONSIN: Oshkosh, *Kellerman*.

ILLINOIS: Athens, *Hall*, June, 1868; Marion County, *French*, June 7, 1873.

TENNESSEE: Near Nashville, *Gattinger*.

MISSOURI: Allenton, *Letterman*, August, 1880; Desoto, *Hasse*, June, 1887; Shannon County, *Bush*, June 2, 1890; Eagle Rock, *Bush*, 159, June 22, 1897.

INDIAN TERRITORY: Muscogee, *Carleton*, April 25, 1891 (in flower).

OKLAHOMA: Paradise, *Waugh*, June 22, 1893.

TEXAS: Near Hockley, *Thurow*, September, 1890; College Station, *Dewey*, June 10, 1891.

Several other Texan sheets were examined, but as the plants are only in flower it is impossible to determine whether they are the species or its variety. The specimens are as follows: Fort Chadbourne (*Swift* in 1856); Houston (*Hall* 257 in 1872); Gillespie County (*Jermy* 138); Houston (*Rose* in 1899).

Polytaenia nuttallii texana C. & R., var. nov.

Fruit more commonly obovate, with much thinner wings (the body not at all depressed), filiform dorsal and intermediate ribs, and distinct and broader oil tubes.

Type locality, near Industry, Tex.; collected by *Warzlow* in 1895; type in U. S. Nat. Herb.

Southern Texas.

Specimens examined:

TEXAS: San Antonio, *Havard*, in 1882; Kerrville, Kerr County, *Heller* 1669, June 25, 1894; type specimens as cited under type locality.

56. OXYPOLIS Raf. Neogen. 2. 1825.

Tiedemannia DC. Coll. Mém. **5**: 51. 1829.
Archemora DC. Coll. Mém. **5**: 52. 1829.

Calyx teeth evident. Fruit flattened laterally, ovate to obovate, glabrous. Carpel with dorsal and intermediate ribs filiform; lateral wings closely contiguous to those of the other carpel and nerved dorsally at the inner margin (giving the appearance of 5 filiform ribs on the back of each carpel); strengthening cells beneath the dorsal ribs and nerves of the lateral wings. Stylopodium thick, short conical. Oil tubes solitary in the intervals, 2 to 6 on the commissural side. Seed face plane.

Smooth erect swamp herbs, with fascicled tubers, leaves simply pinnate or ternate or reduced to petioles, involucre of few bracts or none, involucels of numerous small bractlets or none, and white flowers.

First species cited by Rafinesque, *Sium rigidius* L. Sp. Pl. **1**: 251. 1753.

A genus of 5 species, belonging to North America.

Leaves reduced to cylindrical jointed petioles ..... 1. *O. filiformis.*
Leaves either ternate or pinnate.
Leaves ternate; leaflets entire ..... 2. *O. ternata.*
Leaves pinnate; leaflets mostly toothed.
Leaflets entire or sharply-toothed; lateral wings broad; eastern .. 3. *O. rigidior.*
Leaflets from serrate to crenate-toothed; lateral wings narrow; western.
Leaflets 5 to 9; rays unequal; Rocky Mountains ..... 4. *O. fendleri.*
Leaflets 9 to 13; rays equal or nearly so; Oregon ..... 5. *O. occidentalis.*

1. **Oxypolis filiformis** (Walt.) Britton, Mem. Torr. Club **5**: 239. 1894.

Oenanthe filiformis Walt. Fl. Car. 113. 1788.
Oenanthe teretifolia Muhl. Cat. 31. 1813.
Tiedemannia teretifolia DC. Coll. Mém. **5**: 81. pl. 12. 1829.
Peucedanum teretifolium Wood, Bot. & Flor. 136. 1870.

Stem 6 to 18 dm. high, fistulous; leaves reduced to cylindrical hollow pointed petioles (jointed by transverse partitions); umbel 6 to 12-rayed, with involucre and involucels of few or many subulate bracts; rays 1 to 4 cm. long; pedicels 4 to 6 mm. long; fruit somewhat obovate, 4 to 5 mm. long, truncate or rounded at base and rounded at apex, and with wings thinner than the body; disk prominent, with a short conical stylopodium; oil tubes large, filling the intervals, 2 to 4 on the commissural side.

Type locality not given, but presumably in the Carolinas.

Ponds and swamps, from southern Virginia to Florida and west to Louisiana.

Specimens examined:

Florida: Apalachicola, *Chapman;* Biscayne Bay, *Palmer,* in 1874; Jacksonville, *Curtiss,* in 1875, 1893, and 1894; southern Florida, *Garber,* April, 1877; *Simpson,* in 1889; Baldwin, Duval County, *Nash* 2596, September 6, 1895.

Mississippi: Ocean Springs, Jackson County, *Skehan,* June 24, 1895; same station, *Pollard* 1015, July 25, 1896.

Oxypolis filiformis canbyi C. & R., var. nov.

Fruit orbicular or short oblong, retuse at base and apex, with thick corky lateral wings (leaving the body depressed), an inconspicuous disk with a slender conical stylopodium, and smaller oil tubes not filling the intervals.

Type locality, moist upland meadows, Ellendale, Del.; collected by *Canby,* August, 1867; type in U. S. Nat. Herb.

Only known from the type locality, our specimens being from collections made by *Canby* in 1867, 1874, and 1891; and by *Commons* in 1877.

As this form contradicts one of the chief characters of *Oxypolis*, it may represent a different generic type, but its very close resemblance to *O. filiformis* in other regards, and its extremely local occurrence constrain us to regard it rather as a well-established local variety.

2. **Oxypolis ternata** (Nutt.) Heller, Cat. N. Am. Pl. 5. 1898.

Peucedanum ternatum Nutt. Gen. **1**: 182. 1818.
Archemora ternata Nutt. in Torr. & Gray, Fl. **1**: 631. 1840.
Neurophyllum longifolium Torr. & Gray, Fl. **1**: 613. 1840.
Tiedemannia ternata C. & R. Bot. Gaz. **12**: 74. 1887.

Stem slender, 6 to 9 dm. high; leaves few, with very long petioles, ternately divided into more or less elongated entire linear or filiform leaflets, or sometimes reduced to two leaflets or even one; umbel 6 to 9-rayed, with involucre of few small bracts, and involucels of several setaceous bractlets; rays 2.5 to 4 cm. long; pedicels 6 to 10 mm. long; fruit ovate to obovate, 4 mm. long; oil tubes smaller than in *O. filiformis*, 4 on the commissural side.

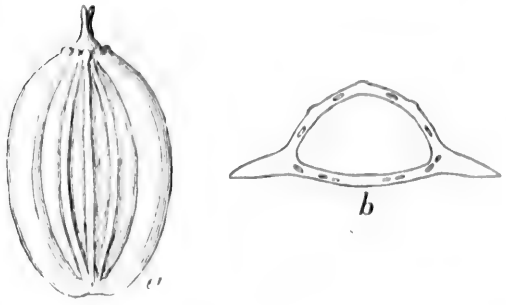


FIG. 58.—Oxypolis rigidior: *a*, × 8; *b*, × 12.

Type locality, "on the bushy margins of swamps, in the pine forests of North and South Carolina."

Pine barren swamps, from North Carolina to Florida.

Specimens examined:

FLORIDA: Low pine barrens, Apalachicola, *Chapman*; same station, *Curtiss* 1040, November, 1880.

3. **Oxypolis rigidior** (L.) Raf. in Seringe, Bull. Bot. 218. 1830.

FIG. 58.

Sium rigidius L. Sp. Pl. **1**: 251. 1753.
Archemora rigida DC. Prodr. **4**: 188. 1830.
Peucedanum rigidum Wood, Bot. & Flor. 136. 1870.
Tiedemannia rigida C. & R. Bot. Gaz. **12**: 74. 1887.

Stem 6 to 15 dm. high; leaves pinnate, 3 to 9-foliolate; leaflets from ovate or lanceolate-oblong to linear-lanceolate, entire or remotely toothed; umbel 15 to 25-rayed, with involucre or few small bracts, and involucels of several setaceous bractlets; rays 3 to 10 cm. long; pedicels 6 to 18 mm. long; fruit oblong, 5 to 7 mm. long; oil tubes 4 to 6 on the commissural side.

Type locality, "Virginia;" collected by *Clayton*.

Swamps from New York to Florida, and west to Minnesota and Louisiana.

Specimens examined:

NEW YORK: Erastina, Richmond County, *Pollard*, August 21, 1894.

PENNSYLVANIA: Delaware County.

NEW JERSEY: Port Morris, *Holmes* 393, September 4, 1890.

MARYLAND: Near Baltimore, *Forcman*, in 1873; same station, *Taylor*, October 15, 1891.

DISTRICT OF COLUMBIA: Washington, *Ward*, September 15, 1875; Tacoma, *Miss E. W. Cathcart*, October 7, 1894.

NORTH CAROLINA: Highlands, *Boynton*, August, 1888; Roan Mountain, altitude 1,800 to 1,900 meters, *Merriam*, August 8–September 9, 1892.

SOUTH CAROLINA: Aiken, *Ravenel*, August, 1869; Oconee County, *Anderson* 1564, September 15, 1898.

GEORGIA: Tallulah River, altitude 510 meters, *Small*, August 18–20, 1903.

FLORIDA: Aspalaga, *Chapman*.

MISSISSIPPI: Waynesboro, Wayne County, *Pollard* 1246, August 8–9, 1896.

ARKANSAS: Near Texarkana, Miller County, *A. A. & E. Gertrude Heller* 4128, August 23, 1898.

MISSOURI: *Bush*, in 1889; near St. Louis, *Glatfelter*, September 8, 1895.

KENTUCKY: Bell County, *Kearney* 499, September, 1893.

INDIANA: Clarke, Lake County, *Umbach*, August 28, 1897.

ILLINOIS: *Brendel*, in 1873.

IOWA: Ames, *Ball* 29, August 15, 1896.

MICHIGAN: Near Hubbardston, *Wheeler*, September 6, 1890.

WISCONSIN: Camp Douglas, *Mearns* 397, August 22, 1890.

MINNESOTA: Fort Snelling, *Mearns* 280, August, 1889 and 1891.

The original specific name of Linnaeus is *rigidius*, the neuter comparative of *rigidus*. In the various shiftings of the name it has been changed to the positive form, *rigidus*, *-da*, or *rigidum*. We restore the comparative form, which was evidently what Linnaeus intended.

Oxypolis rigidior longifolia (Pursh) Britton, Mem. Torr. Club **5**: 239. 1894.

Sium longifolium Pursh, Fl. **1**: 194. 1814.
Oenanthe ambigua Nutt. Gen. **1**: 189. 1818.
Archemora ambigua DC. Prodr. **4**: 188. 1830.
Archemora rigida ambigua Wood, Class-book, ed. 2, 380. 1860.
Tiedemannia rigida ambigua C. & R. Rev. N. Am. Umbell. 47. 1888.

Leaves elongated, linear, entire; rays fewer; fruit but 4 mm. long. Type locality, "in ditches and bogs, New Jersey."
From New Jersey to South Carolina and Tennessee.

We have not reexamined this material.

4. **Oxypolis fendleri** (Gray) Heller, Bull. Torr. Bot. Club **24**: 478. 1897.

Archemora fendleri Gray, Pl. Fendl. 56. 1849.
Tiedemannia fendleri C. & R. Rev. N. Am. Umbell. 48. 1888.

Stem slender, simple, 3 to 6 dm. high, from a large fascicle of tubers (2.5 cm. long); leaves pinnate, 5 to 9-foliolate; leaflets ovate or oblong (or lanceolate in upper leaves), obtuse, 2.5 to 5 cm. long, incisely serrate; umbel unequally 5 to 12-rayed, with neither involucre nor involucels; rays 1 to 3.5 cm. long; pedicels 4 to 8 mm. long; fruit

ovate, scarcely 4 mm. long, with rather more prominent dorsal and intermediate ribs and narrower lateral wings than in the other species; oil tubes 2 to 4 on the commissural side.

Type locality, "margins of Santa Fe Creek [New Mexico], in ferruginous soil;" collected by *Fendler*, no. 272, June–July, 1847; type in Herb. Gray.

In the Rocky Mountains from New Mexico to Wyoming.

Specimens examined:

NEW MEXICO: Hermits Peak, *Snow;* near Santa Fe (at type locality), *A. A. & E. Gertrude Heller* 3801, July 2, 1897.

COLORADO: Twin Lakes, *Wolf* 723, July, 1873; mountains near timber line, *Mrs. Eastwood*, July 23, 1890; Steamboat Springs, altitude 2,100 meters, *Crandall*, July 26, 1891; Gypsum Creek Canyon, altitude 2,400 meters, *Crandall*, August 7, 1894; Telluride, altitude 3,000 meters, *Tweedy* 207, August 18, 1894; Cameron Pass, altitude 3,000 meters, *Baker*, July 15, 1896; Bob Creek, southern Colorado, altitude 3,150 meters, *Baker, Earle & Tracy* 851, July 1, 1898.

WYOMING: Centennial Hills, *Nelson* 2697, August 20, 1896; Battle Lake, Carbon County, *Nelson* 4183, August 16, 1897.

5. **Oxypolis occidentalis** C. & R. sp. nov.

Resembling *O. fendleri*, but taller and stouter; leaves 9 to 12-foliolate; leaflets usually larger; umbels with more numerous and more widely spreading equal rays, and involucels of linear bractlets; fruit larger (5 mm. long).

Type locality, in springy meadows west of Crater Lake, Oregon, altitude 1,870 meters; collected by *J. B. Leiberg*, no. 4413, in 1899; type in U. S. Nat. Herb.

Oregon.

Specimens examined:

OREGON: Type specimens as cited under type locality; same station, *Cusick & Leiberg* 417, August 15, 1896.

This species is very distinct geographically from its nearest ally, *O. fendleri*.

57. **LEPTOTAENIA** Nutt. in Torr. & Gray, Fl. 1: 629. 1840.

Calyx teeth obsolete or sometimes evident. Fruit flattened dorsally, oblong-elliptical, glabrous. Carpel with dorsal and intermediate ribs filiform or obscure; lateral wings very thick and corky, with large groups of thick-walled strengthening cells; commissural face with a prominent central longitudinal ridge left after separation from the carpophore. Stylopodium wanting. Oil tubes 3 to 6 in the intervals, 4 to 6 on the commissural side, mostly small, sometimes obsolete. Seed very flat, with plane or slightly concave face.

Usually tall and stout glabrous nearly acaulescent perennials, with thick often very large fusiform roots, usually large pinnately decompound leaves, involucre of few bracts or none, involucels of numerous small bractlets, and yellow or purple flowers.

First species cited, *Leptotaenia dissecta* Nutt.

A genus of 11 species, belonging to western United States and British Columbia.

For a critical discussion of this genus in relation to its allies, see our Revision N. A. Umbell. 50.

Foliage puberulent.
Fruit sessile or nearly so; staminate flowers on slender pedicels.
Flowers purple ..... 1. *L. dissecta.*
Flowers yellow ..... 2. *L. foliosa.*
Fruit with pedicels longer than those of the staminate flowers.
Fruit usually 8 to 12 mm. long; leaves finely dissected ..... 3. *L. multifida.*
Fruit larger; foliage less dissected ..... 4. *L. eatoni.*
Foliage glabrous.
Leaves finely dissected.
Involucels conspicuous and more or less united.
Bractlets obovate, toothed near apex ..... 5. *L. anomala.*
Bractlets lanceolate, entire ..... 6. *L. humilis.*
Involucels neither conspicuous nor united.
Fruit broadly oblong (10 to 12 mm. broad); lateral wings prominent and thick; oil tubes conspicuous, 3 in the intervals; leaflets filiform. 7. *L. purpurea.*
Fruit narrowly oblong (4 to 6 mm. broad) or short-oblong; lateral wings not prominent; oil tubes inconspicuous, mostly solitary in the intervals or wanting; leaflets shorter.
Fruit short-oblong; peduncles slender.
Leaflets rigid, pungent; flowers purple; Washington ..... 8. *L. watsoni.*
Leaflets thin, not rigid.
Flowers salmon color; pedicels long ..... 9. *L. salmoniflora.*
Flowers deep yellow; pedicels short ..... 10. *L. leibergii.*
Fruit narrowly oblong; peduncles enlarged and turgid ..... 11. *L. minor.*
Leaflets broad ..... 12. *L. californica.*

1. **Leptotaenia dissecta** Nutt. in Torr. & Gray, Fl. 1: 630. 1840.

Ferula dissecta Gray, Proc. Am. Acad. 7: 348. 1868.
Ferula dissoluta Watson, Bot. Calif. 1: 271. 1876.

About 3 to 9 dm. high, leafy at base; leaves broad, 3 dm. or so long, ternate and thrice pinnate; segments ovate or oblong, 1 to 2.5 cm. long, pinnatifidly laciniate-lobed and toothed, puberulent on the veins (beneath) and margins; umbel 8 to 20-rayed, with an involucre of few linear bracts and involucels of several linear bractlets; rays 5 to 13 cm. long; flowers purple; sterile flowers pedicelled; fruit sessile or nearly so, 10 to 18 mm. long, about 6 mm. broad; strengthening cells in the distinct filiform dorsal and intermediate ribs, as well as in the laterals; seed face plane.

Type locality, "plains of the Oregon [Columbia] near the confluence of the Wahlamet;" collected by *Nuttall;* type in Herb. Philad. Acad.

From northern California to Vancouver Island.

Specimens examined:

CALIFORNIA: Sisson, Siskiyou County, *Brown*, in 1897.
OREGON: Edge of prairies, *Howell*, July, 1880.

WASHINGTON: *Suksdorf*, in 1881; rocky hillsides, Columbia River, Klickitat County, *Suksdorf* 1209, March 30, 1886.

BRITISH COLUMBIA: Gordon Head, Vancouver Island, *Macoun*, May 30, 1887.

2. **Leptotaenia foliosa** (Hook.) C. & R.

Leptotaenia dissecta foliosa Hook. Lond. Jour. Bot. **6**: 236. 1847.

Acaulescent, 6 dm. high, glabrous and somewhat glaucous; leaves 2 to 3 times ternate then pinnately compound, the ultimate segments linear and entire or cut into linear lobes, often obtuse, only slightly puberulent on midrib and margins; umbel 8 to 22-rayed, with an

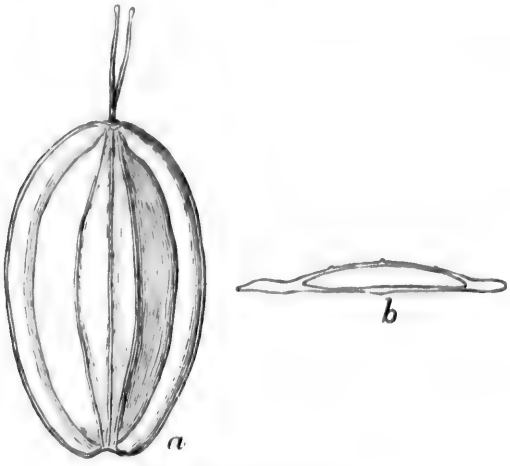


FIG. 59.—Leptotaenia multifida: *a*, × 4; *b*, × 6.

involucre of several linear bracts, and involucels of few linear bractlets; flowers yellow; sterile flowers on slender pedicels; fruit (immature) on very short pedicels, glaucous.

Type locality, "fertile slopes of the mountains [Nez Perces, Idaho], near the snow line;" collected by *Geyer*, no. 517.

Western Idaho.

Specimens examined:

IDAHO: Nez Perces County, about Lake Waha, *Sandberg* 227, May 27, 1892.

This species seems quite distinct from *L. dissecta* and has a very different range. We have not seen Geyer's plant, but it came from the same locality as the material collected by Sandberg.

3. **Leptotaenia multifida** Nutt. in Torr. & Gray, Fl. 1: 630. 1840.
FIG. 59.

Ferula multifida Gray, Proc. Am. Acad. **7**: 348. 1868.

Resembling *L. dissecta*, but with more finely divided leaves; umbels mostly without involucre; flowers purple or yellow; pedicels of the fruit 6 to 24 mm. long; fruit 8 to 12 mm. long, and with no strength-

oing cells in the almost obsolete dorsal and intermediate ribs; seed face concave, the carpel section being crescentic.

Type locality, "plains of the Oregon [Columbia], east of Wallawallah, and in the Blue Mountains;" collected by *Nuttall;* type in Herb. Philad. Acad.

From western Wyoming and Montana to New Mexico and west to Washington and California.

Specimens examined:

WYOMING: Druid Peak, Yellowstone Park, *A. & E. Nelson* 5777, July 12, 1899.

MONTANA: Helena, *Kelsey*, May, 1887; *Tweedy*, in 1889; near Red Lodge, *Rose* 10, July 24–25, 1893; Columbia Falls, *Williams* 194, June–July, 1894; Flathead County, *Holzinger & Blake* 11, July 16–19, 1898.

WYOMING: Fort Bridger, *Porter*, July 8, 1873; Yellowstone Park, *Tweedy*, in 1885.

COLORADO: Durango, *Alice Eastwood*, June 5, 1890; Routt County, *Crandall* 22, July 16, 1894; Glenwood Springs, *Osterhout*, June, 1895; Baldwin, *Bethel* 25*a*, June 19, 1897; near Dix, La Plata County, *Baker, Earle & Tracy* 662, July 10, 1898; Durango *Bethel* 25*b*, June 28, 1898.

ARIZONA: About Mormon Lake, *MacDougal* 58, June 11, 1898.

NEVADA: Trinity Mountains, *Watson* 460, May, 1868; Carson City, *Jones* 3878, May 23, 1882; Ruby Hill, *Jones*, July 8, 1891; Aurum, *Jones*, May 20, 1893.

IDAHO: *Leiberg*, in 1892; Blue Lakes, *Palmer* 84, June 2, 1893.

WASHINGTON: *G. R. Vasey*, in 1883 and 1889; Yakima County, *Henderson* 2579, June 14, 1892; *Sandberg & Leiberg* 54, 212, in 1893; Whitman County, *Elmer* 136, May, 1897.

OREGON: *Cusick*, in 1884 and 1898; Morrow County, *Leiberg* 50, May 10, 1894.

CALIFORNIA: Sierra Nevada, *Lemmon*, in 1875; San Bernardino Mountains, *G. R. Vasey*, May, 1880; Sierra County, *Lemmon*, June, 1886 and 1889; Summit, Placer County, *Alice Eastwood*, June, 1898.

A specimen collected by *Mrs. Katharine Brandegee* at Tehachapi, Cal., June, 1884, is probably best referred to this species, but it has coarser foliage, and fruit 16 mm. long.

4. **Leptotaenia eatoni** C. & R. Rev. N. Am. Umbell. 52. 1888.

Like *L. multifida*, but with less dissected leaves; umbels few-rayed; pedicels of fruit 8 to 12 mm. long; fruit 16 to 18 mm. long, 8 to 10 mm. broad, flatter and thinner than in any other species; oil tubes 4 to 6 in the intervals, 4 on the commissural side, a prominent corky nerve on the commissural face of the lateral wing near the inner margin; seed face plane.

Type locality, "Utah;" collected by *D. C. Eaton*, no. 147, June-July, 1869; type in Herb. Coulter.

Specimens examined:

UTAH: Type specimens as cited under type locality; Silver Reef, altitude 1,350 meters, *Jones* 5176, May, 1894; head of Salina Canyon, altitude 2,400 meters, *Jones* 5441, June 15, 1894.

IDAHO: Cuddy Mountains, *Jones*, July 11, 1899.

WYOMING: Evanston, Uinta County, *Nelson* 2982, May 29, 1897.

We have not been able to reexamine the type, but the above specimens seem to be referable to this species.

5. **Leptotaenia anomala** C. & R. Rev. N. Am. Umbell. 53. 1888.

Acaulescent, glabrous, with slender scape (15 to 30 cm. high) bearing an unequally 3 to 6-rayed umbel; leaves slender-petioled, pinnate with few distant very narrowly linear divisions; umbel with no involucre, and involucels of prominent scarious-margined veiny bractlets more or less united; rays 2.5 to 7.5 cm. long; pedicels hardly 2 mm. long; fruit small, in nearly sessile clusters of 2 to 8, oblong, 3 mm. long, about 4 mm. broad, the lateral ribs considerably thicker than the body, the dorsal and intermediates very slender filiform to obsolete, occasionally with minute calyx teeth; oil tubes none; the commissural ridge small or almost wanting.

Type locality, "Carbondale [Mount Diablo region], California;" collected by *M. K. Curran*, May, 1886; type in Herb. Coulter.

Only known from the type locality.

Specimens examined:

CALIFORNIA: Type locality, *Brandegee*, April–June, 1889; same station, from *Herb. Greene*, April 6, 1894.

6. **Leptotaenia humilis** C. & R., sp. nov.

Low, acaulescent, glabrous throughout; leaves about 3 times ternate, ultimate segments elongated, linear, entire; peduncle 1 to 2 dm. long; rays very unequal, 2 to 5 cm. long; pedicels 1 to 7 mm. long; involucre none; bractlets of the involucel linear to lanceolate, acuminate, scarious-margined; fruit oblong, 6 mm. long, the wings very thick and corky.

Type locality, plains near Chico, Butte County, Cal.; collected by *Mrs. C. C. Bruce*, no. 2661, May, 1897; type in Herb. Cal. Acad. Sci., fragment and photograph in U. S. Nat. Herb.

Specimens examined:

CALIFORNIA: Type specimens as cited under type locality; also Little Chico Creek, *Mrs. Austin* 257, in 1896.

This species is nearest *L. anomala*, but certainly very distinct.

7. **Leptotaenia purpurea** (Watson) C. & R. Rev. N. Am. Umbell. 52. 1888.

Ferula purpurea Watson, Proc. Am. Acad. **21**: 453. 1886.

About 3 dm. high; leaves completely glabrous, very much dissected, the ultimate segments linear or filiform; umbel 8 to 20-rayed, with no involucre, and involucels of several linear acuminate bractlets; rays 7.5 to 10 cm. long; flowers purple; fruit 18 to 24 mm. long, as long as the pedicels, 10 to 12 mm. broad, with a much more prominent corky margin and commissural ridge than in any other species; oil tubes prominent, 3 in the intervals of the distinct dorsal and intermediate ribs, 4 on the commissural side.

Type locality, "on rocky hillsides near the lower Columbia River, in Klickitat County, Wash.," collected by *Suksdorf*, no. 281, March 21, 1880; type in Herb. Gray. Associated with the type in the origi-

ral description are *Howell* of 1879 and *Mrs. P. G. Barrett* of 1884, both cited below.

Rocky hillsides near the Columbia, in Washington and Oregon, chiefly between Hood River and the Dalles.

Specimens examined:

WASHINGTON: Simcoe Mountains, *Howell*, June, 1879; type specimens as cited under type locality; same station, *Suksdorf* 26, March (flower) and June (fruit), 1881; near the Dalles, *Henderson*, in 1892.

OREGON: Near the Dalles, *Howell*, May, 1880; Hood River, *Mrs. P. G. Barrett*, in 1884.

Mr. Howell writes that this species seems to be very local, probably being restricted to a region less than 20 miles square.

8. **Leptotaenia watsoni** C. & R. Rev. N. Am. Umbell. 52. 1888.

About 3 dm. high or less, rather stout, somewhat branching; leaves few and small, at or near the base, ternate-pinnately decompound, the ultimate segments very small, ovate and cuspidate; umbel with 5 to 10 variously elongated divaricate rays, no involucre, and involucels of few setaceous bractlets; rays 5 to 10 cm. long; fruiting pedicels (2 to 8 or 10 in number) about 1 cm. long and divaricate; fruit (immature) 12 mm. long; oil tubes 3 in the intervals; seed face concave.

Type locality, "in the Wenatchee region," Kittitas County, Wash., altitude 1,200 meters; collected by *Brandegee*, no. 801, and *Tweedy*, no. 848, July, 1883; type in Herb. Canby (now in College of Pharmacy, New York City).

Only known in the region of the type locality.

Specimens examined:

WASHINGTON: Type specimens as cited under type locality; slopes of Mount Stuart (Cascades), Wenatchee Valley, altitude 1,220 meters, *Sandberg & Leiberg* 808, August 28, 1893; same station, altitude 1,950 meters, *Elmer* 1171, July, 1898.

9. **Leptotaenia salmoniflora** C. & R.

Peucedanum salmoniflorum C. & R. Contr. Nat. Herb. **3**: 228. 1895.

Short caulescent or sometimes tall, 3 to 4.5 dm. high, bearing 3 or 4 leaves, glabrous throughout; leaves large, ternately decompound, finely dissected; ultimate segments short-filiform; umbel few (4 to 10) and somewhat unequally-rayed, with no involucre, and involucels of few filiform bractlets; rays 2.5 to 5 cm. long; pedicels 8 to 12 mm. long; flowers salmon color; fruit oblong, 10 mm. long; dorsal and intermediate ribs low and obtuse; lateral wings narrow; oil tubes solitary in the intervals, 2 on the commissural side; seed somewhat constricted near the middle.

Type locality, "on basaltic rocks, near upper ferry, Clearwater River, above Lewiston," Nez Perces County, Idaho; collected by *Sandberg*, no. 24, April 24, 1892; type in U. S. Nat. Herb.

On basaltic rocks, Nez Perces County, Idaho, and eastern Washington (Whitman County).

Specimens examined:

IDAHO: Type specimens as cited under type locality.

WASHINGTON: Basaltic cliffs, Wawawai, Whitman County, *Piper* 2782, April 17, 1897.

10. **Leptotaenia leibergi** C. & R., sp. nov. PLATE VII.

Low caulescent plants from rather large shallow tuberous roots; peduncles elongated, 15 to 25 cm. long, erect or somewhat spreading, glabrous; leaves ternately dissected, the ultimate segments linear, 4 to 8 mm. long; flowering umbels very much contracted; fruiting umbels rather irregular, with no involucre, and involucels of 3 or 4 small bractlets; longer rays 3 cm. long; pedicels 4 to 6 mm. long; flowers deep yellow; fruit oblong, 6 to 8 mm. long, 4 mm. broad, with filiform dorsal and intermediate ribs, and narrow rather thickish laterals; oil tubes indistinct, perhaps solitary in the intervals, and 2 on the commissural side.

Type locality, wet adobe soils of Barren Valley, Malheur County, Oregon, where it is said to be common; collected by *Leiberg*, no. 2197, June, 1896; type in U. S. Nat. Herb.

Only known from the type locality.

Specimens examined:

OREGON: Type specimens as cited under type locality.

EXPLANATION OF PLATE VII.—Fig. *a*, dorsal view of carpel.

11. **Leptotaenia minor** Rose; Howell, Fl. N. W. Am. **1**: 251. 1898.

Acaulescent or nearly so, glabrous throughout, from large branching and somewhat starchy roots; leaves 15 to 20 cm. long (including the petiole), finely dissected, with short linear acute ultimate segments and an inconspicuous stipular sheath; peduncle thick and turgid, especially at maturity, 15 to 20 cm. long, somewhat glaucous; umbel unequally-rayed, with no involucre, and involucels of several linear bractlets; rays 2 to 6 cm. long; pedicels 10 to 14 mm. long; flowers light purple; fruit oblong, 14 to 16 mm. long, 5 to 7 mm. wide; oil tubes 1 or 2 in the intervals, not conspicuous.

Type locality, near Rock Creek, Morrow County, "John Day Country, Oregon," altitude 1,040 meters; collected by *Leiberg*, no. 98, May 22, 1894; type in U. S. Nat. Herb.

Eastern Oregon.

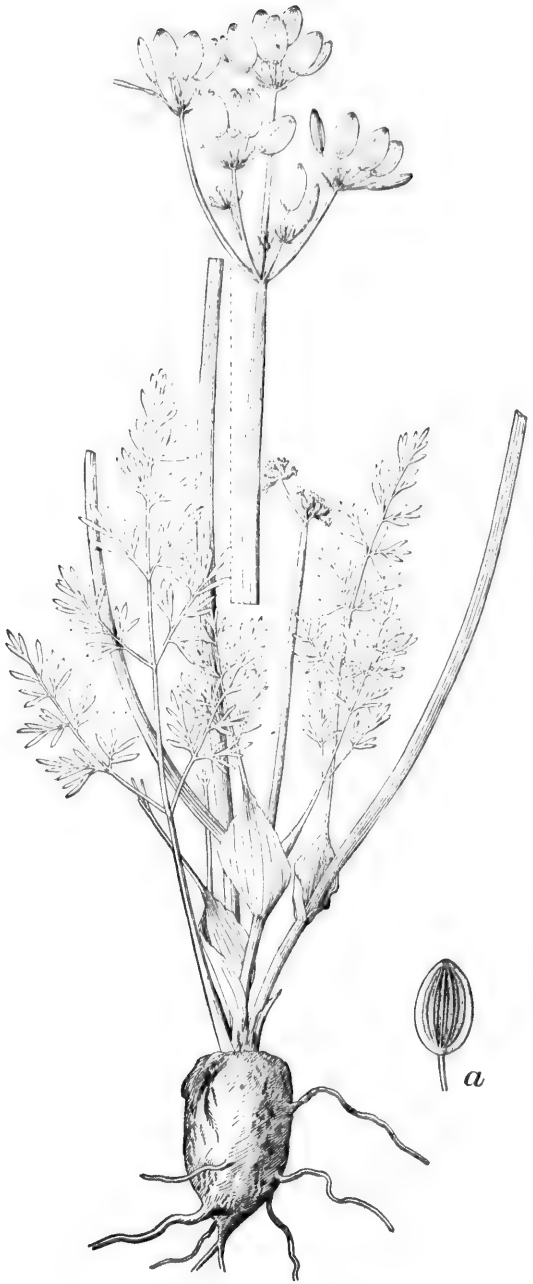
Specimens examined:

OREGON: Type specimens as cited under type locality; Lost Valley, *Howell* 414, May, 1882; near Antelope, *Howell* 421, May 10, 1885.

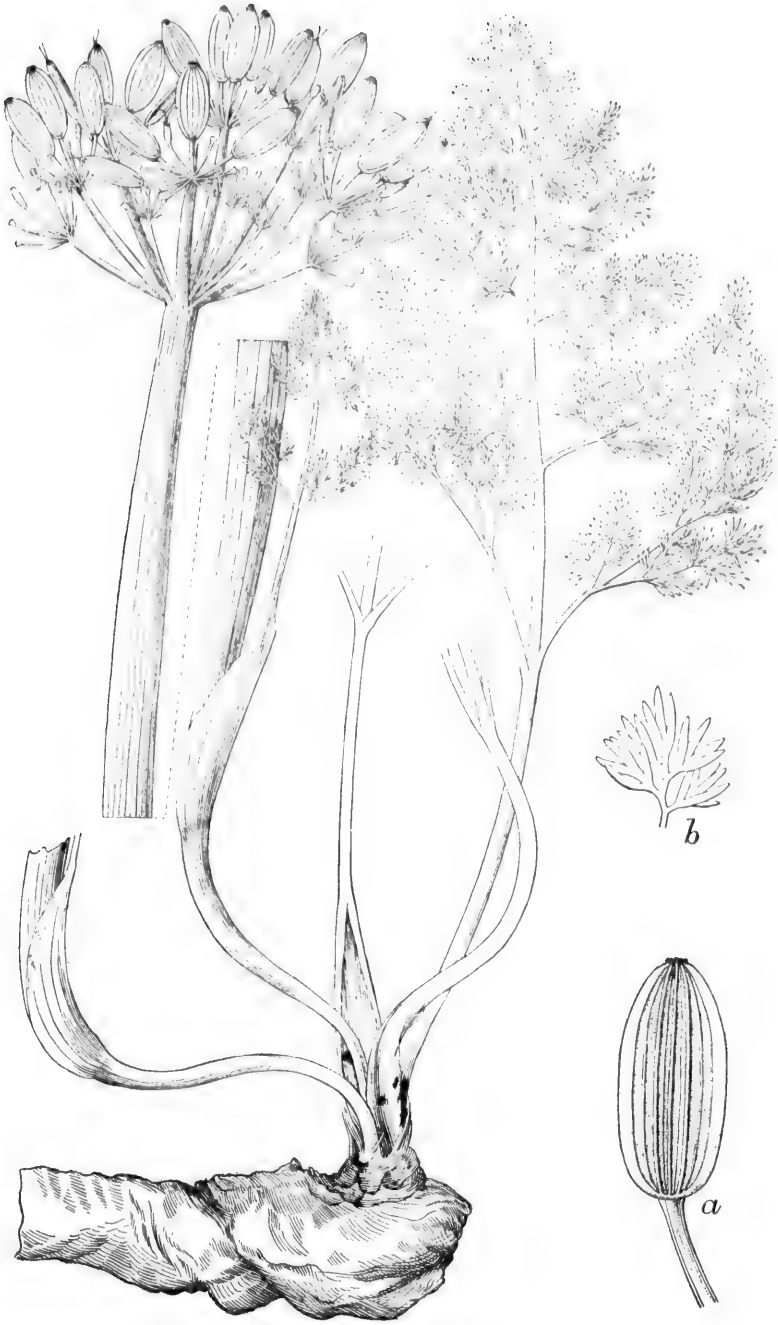
EXPLANATION OF PLATE VIII.—Fig. *a*, dorsal view of carpel; *b*, enlarged view of tip of leaf.

Howell 414, from Lost Valley, was distributed as *L. purpurea*, and seems to have been included by Watson in his original description of that species.

In habit this species much resembles *L. purpurea*, but the leaflets are much shorter, the fruit is very different, while it lacks the large purple sheathing bracts at the base of the stem. The fruit is more like that of *L. watsoni* and *L. salmoniflora*, but is very distinct from either.



LEPTOTAENIA LEIBERGI C. & R., sp. nov.



LEPTOTAENIA MINOR ROSE.

In Mr. Leiberg's field notes is the following interesting description of the habitat: "The species was found on the high basaltic table-lands which form the western ...rs of the Blue Mountains in Gilliam and Morrow counties, Oregon, at altitudes ...rying from 900 to 1,200 meters. It is a very striking and peculiar plant in the ...ra of that region, owing partly to its aspect and partly to the close limitation of ... habitat. On the summits of the plateaus and along the upper slopes where they ...eak off to the great canyons that cut them, are found in large numbers long, sinu...s, narrow lines of basaltic talus that meander in all directions through the other...se grassy or turfy plateau. These lines of talus mark the existence of shallow ...pressions in the lava sheet, and form the drainage channels of the more level por...n of the table-lands. Among the loose rocks of these drainage channels grows the plant. The large starchy roots lie horizontally and rather loosely among the rocks at a depth varying from about 5 to 12 cm. There is no soil about them except a slight covering of closely adhering mud deposited by the percolating waters."

Mr. Howell also writes that this species is very local, "probably not growing outside of a district 50 miles square."

12. **Leptotaenia californica** Nutt. in Torr. & Gray, Fl. 1: 630. 1840.

Ferula californica Gray, Proc. Am. Acad. 7: 348. 1868.

About 6 dm. high, glabrous throughout, with 1 or 2 stem leaves; leaves ternate and pinnate or twice ternate; leaflets cuneate-obovate, 2.5 to 5 cm. long, usually 3-lobed, coarsely toothed above; umbel 15 to 20-rayed, with involucre of 1 or 2 narrow bracts or none, and no involucels; rays 5 to 10 cm. long; pedicels 4 to 8 mm. long; flowers yellow; fruit 10 to 14 mm. long, 6 to 8 mm. broad, with narrower laterals than in any other species; dorsal and intermediate ribs indistinct; oil tubes 3 or 4 in the intervals, 6 on the commissural side.

Type locality, "Santa Barbara, Upper California;" collected by *Nuttall*.

California and adjacent Oregon.

Specimens examined:

CALIFORNIA: Borax Lake, *Torrey* 168, in 1865; *Kellogg & Harford* 318, in 1868–69; near Fort Tejon, Kern County, altitude 1,000 meters, *Coville & Funston* 1162, July 2, 1891; Pah-Ute Peak, southeastern California, altitude 1,800 to 2,100 meters, *Purpus* 5092, April–September, 1897.

OREGON: Grave Creek, *Howell*, May 21, 1884; Rogue River Valley, *Howell*, April 15, 1887; near Little Klamath Lake, Klamath County, altitude 1,290 meters, *Applegate* 2033, May 11, 1898.

The specimens of Oregon differ somewhat from the Californian forms, being more glaucous, with larger fruit (14 mm.) and broader laterals.

Leptotaenia californica platycarpa Jepson, Erythea 1: 8. 1893.

Caulescent, 12 dm. high; leaves biternate then pinnate, with dilated petioles; leaflets cuneate-obovate, 3-lobed or the terminal 3-parted, the lobes coarsely toothed; rays equal, 5 to 7.5 cm. long; pedicels 10 mm. long; fruit oblong-ovoid, 14 mm. long, 10 mm. broad, broadly winged, emarginate at both ends; oil tubes 3 in the intervals, 6 on the commissural side.

Type locality, "Gates Canyon, Vaca Mountains," California, alti-

tude 400 meters; collected by *Jepson*, March 25 (in flower) and June 20 (in fruit), 1892; type in Herb. Univ. Calif.

We have not seen this plant, and simply adapt the original description.

Leptotaenia californica dilatata Jepson, Erythea **1**: 63. 1893.

"Leaves nearly as in the type; peduncles at summit abruptly widened into a disciform dilatation 9 lines in diameter; fruit 7 lines long, 5 lines wide, narrowly margined; oil tubes anastomosing."

Type locality not given; collected by *Bolander*, no. 6529, presumably in California; type in Herb. Univ. Calif.

We have seen no specimens.

58. LOMATIUM Raf. Jour. Phys. **89**: 101. 1819.

Cogswellia Spreng. in Roem. & Schult. Syst. **6**: xlviii. 1820.
Peucedanum L. as to North American species.

Calyx teeth obsolete (very rarely evident). Fruit strongly flattened dorsally, oblong to orbicular. Carpel with filiform and approximate

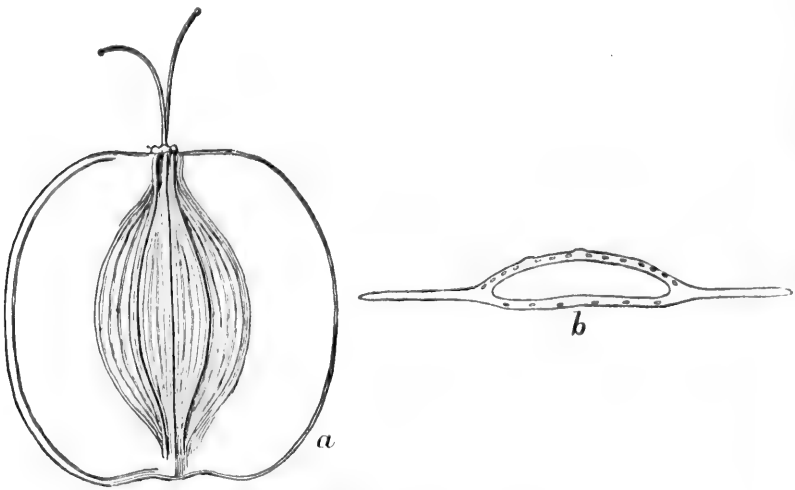


FIG. 60.—Lomatium nevadense: *a*, × 3; *b*, × 4.

dorsal and intermediate ribs, and winged laterals coherent till maturity with those of the other carpel; pericarp thin, with strengthening cells beneath each rib and nerve. Stylopodium wanting. Oil tubes one to several in the intervals (rarely obsolete), 2 to 10 on the commissural side. Seed dorsally flattened, with plane face (rarely slightly concave).

Acaulescent or short caulescent dry ground perennials, with fusiform or tuberous roots, ternate (sometimes pinnate) to dissected leaves, no involucre, involucels mostly present, and yellow, white, or purple flowers.

Type species, *Lomatium villosum* Raf.

A genus of about 60 species, belonging to the drier regions of Western North America.

While preparing our Revision of 1888, we recognized that the North American species referred to *Peucedanum* differ from the European and Asiatic representatives of the genus, and our manuscript was prepared with our species segregated from *Peucedanum*. At the last moment we concluded not to make the change until further knowledge of our species and those of the Old World had been obtained. The twelve years that have elapsed have but strengthened our earlier view, and we hesitate no longer in making a change in which we are also confirmed by the views of other American botanists.

The genus *Peucedanum* was treated by Bentham and Hooker as a vast and unwieldy complex, under which in the Kew Index 40 generic names appear as synonyms. The restoration of these genera has been going on ever since, those with which we are concerned being *Anethum*, *Imperatoria*, *Oxypolis* (*Archemora*, *Tiedemannia*, *Neurosciadium*), and *Pastinaca*, to which we now add *Lomatium* (*Cogswellia*), and *Eurypteru*, the list including 10 of the generic names cited by the Kew Index as synonyms of *Peucedanum*.

The type of *Peucedanum* is *P. officinale* L. Sp. Pl. **1**: 245. 1753, a plant of the low fertile meadows of Europe, and is of an entirely different generic type from the North American species which have been referred to *Peucedanum*, and which represent a very consistent group entirely restricted to Western North America, and form by far our largest and most characteristic umbelliferous genus. Briefly stated, the essential differences between *Peucedanum* and *Lomatium* are as follows: *Peucedanum* consists of tall and branching mesophytic plants of low fertile meadows of the Old World, with several umbels, conical stylopodium, and solitary oil tubes; while *Lomatium* consists of low xerophytic plants of acaulescent habit belonging to the arid regions of Western North America, with usually single umbels terminating simple elongated peduncles, no stylopodium, and often several oil tubes.

The name *Cogswellia* was given by Sprengel because he regarded Rafinesque's *Lomatium* as a homonym. Rafinesque characterizes (Jour. Phys. **89**: 101. 1819) the genus as follows:

"*Lomatium*. (Ombellif.) Fleurs polygames mâles, à involucelles et sans involucres. Fleurs hermaphrodites. Calice ou ovaire comprimé, entier. 5 pétales fléchis, menus. 5 étamines. 2 styles. Semences plates, elliptiques, entières, à peine striées, entourées par une aile membraneuse marginale.—Acaulé, feuilles decomposées, hampe à une ombelle, involucelles polyphylles, les ombellules centrales à fleurs mâles.—Je fonde ce genre sur une jolie plante recueillie sur le Missouri par M. Bradbury, qui me l'a communiquée. Il diffère du genre *Heracleum* par les semences entières, etc., et se rapproche par son port des genres *Athamanta* et *Cymopterus*.

L. villosum. Entièrement velue, feuilles quadripinnées, pétioles membraneux, folioles lancéolées, aiguës, laciniées; hampe plus longue que les feuilles; involucelles lancéolées, aiguës, tomenteuses. Fleurs blanches."

The identification of Bradbury's plant is a matter of inference rather than a certainty. The description calls for a villous plant with white flowers and tomentose involucels, and, unfortunately, no species of *Lomatium* which occurs in the region of Bradbury's collection shows such a combination. *L. orientale* (for synonymy see under species) was collected by Bradbury, and has white flowers, but it is a plant with short soft pubescence and smooth involucels; while *L. foeniculaceum* is a villous plant with tomentose involucels, but has yellow flowers. *L. macrocarpum* is a villous plant and has white flowers, but it is farther west than Bradbury reached. It would seem, therefore, that *Lomatium villosum* Raf. is either *L. orientale* or *L. foeniculaceum*,

and it is more reasonable to suppose that yellow flowers might have been mistaken for white in an herbarium specimen than that a pubescent plant with glabrous involucels could have been said to be villous and with tomentose involucels.

The only other species of *Lomatium* which grows in the east is *L. dasycarpum* (*P. foeniculaceum* of most writers, but not of Nuttall), but that has yellow flowers, and seems not to grow far enough north to be *L. foeniculaceum*. This is doubtless the same species as the *Peucedanum villosum* Nutt., taken up by Watson from Nuttall M[illegible]

Some explanation of these eastern plains species of Nuttall (*P. foeniculaceum* and *P. villosum*) may be helpful to a clearer understanding of the question. Bradbury and Nuttall collected together in the upper Missouri, in what is now North Dakota. Rafinesque named Bradbury's plants, and Nuttall named his own. From the same region Rafinesque described *Lomatium villosum*, and Nuttall described *Ferula foeniculacea*. The earlier botanists, as Hooker, DeCandolle, etc., regarded them as the same, and there seems to be no reason to doubt this conclusion. Torrey and Gray however, included with Nuttall's *Ferula foeniculacea* (as var. *dasycarpa*) forms from the more southern plains, and the name has been gradually shifted to them, so that now in the United States National Herbarium the specimens labelled *Peucedanum foeniculaceum* extend from Nebraska to Texas, entirely south of the type locality of Nuttall's *Ferula foeniculacea*. In the meantime, Watson took up *Peucedanum villosum*, a manuscript name of Nuttall's applied to a plant from "the plains of the Platte," in Nebraska, and made it to include also plants from the far West.

A reasonable conclusion seems to be that *Lomatium villosum* Raf. represents the plants of the northern plains which have been going under the name of *Peucedanum villosum* Nutt., and which are Nuttall's *Ferula foeniculacea;* and that the plants of the more southern plains which have been called *Peucedanum foeniculaceum* represent another species. The type species of *Lomatium*, therefore, is *L. foeniculaceum* as defined in this paper.

Mostly low, from globose tubers; leaves small, more or less dissected.

FLOWERS WHITE.

Fruit puberulent ..... 1. *L. gormanii.*

Fruit glabrous.

Oil tubes none ..... 2. *L. geyeri.*

Oil tubes present.

Oil tubes solitary in the intervals.

Lateral wings thickish ..... 3. *L. hendersonii.*

Lateral wings thin ..... 4. *L. canbyi.*

Oil tubes several in the intervals.

Pedicels slender, longer than the fruit ..... 5. *L. farinosum.*

Pedicels very short, much shorter than the fruit ..... 6. *L. piperi.*

FLOWERS YELLOW.

Fruit puberulent ..... 7. *L. watsonii.*

Fruit glabrous (except in *L. cous*).

Fruit linear.

Umbellets open; pedicels slender (4 to 8 mm. long) ..... 8. *L. ambiguum.*

Umbellets compact; fruit nearly sessile ..... 9. *L. leptocarpum.*

Fruit oblong.

Rather tall, caulescent ..... 10. *L. circumdatum.*

Low, acaulescent.

Oil tubes solitary in the intervals; fruit pubescent ..... 11. *L. cous.*

Oil tubes several in the intervals; fruit glabrous ..... 12. *L. montanum.*

Usually stouter than the last, from more or less thickened roots.

PEDUNCLES USUALLY SLENDER, NEVER SWOLLEN AT THE TOP.

BRACTLETS OF INVOLUCEL CONSPICUOUS, OFTEN BROAD OR UNITED AT BASE.

Bractlets generally obovate.

Oil tubes large, solitary in the intervals.

Fruit small (4 to 10 mm. long) ..... 13. *L. utriculatum.*

Fruit larger (12 to 14 mm. long) ..... 14. *L. vaseyi.*

Oil tubes indistinct, several in the intervals ..... 15. *L. carnifolium.*

Bractlets not obovate.

FLOWERS WHITE.

Bractlets not scarious at margin, but more or less tomentose or villous.

Fruit glabrous.

Fruit with lateral wings much broader than body .. 16. *L. ellipticum.*

Fruit with lateral wings as broad as body or narrower. 17. *L. macrocarpum.*

Fruit tomentose.

Oil tubes solitary in the intervals ..... 18. *L. dasycarpum.*

Oil tubes usually 3 in the intervals ..... 19. *L. tomentosum.*

Bractlets scarious margined, not tomentose.

Oil tubes solitary in the intervals; fruit glabrous ..... 20. *L. orientale.*

Oil tubes several in the intervals; fruit pubescent .... 21. *L. nevadense.*

FLOWERS YELLOW.

Involucels pubescent.

Fruit glabrous ..... 22. *L. dasycarpum.*

Fruit pubescent ..... 23. *L. foeniculaceum.*

Involucels glabrous.

Somewhat scabrous; pedicels 4 to 7 mm ..... 24. *L. vaginatum.*

Glabrous; pedicels 10 to 12 mm ..... 25. *L. marginatum.*

BRACTLETS OF INVOLUCEL SMALL OR WANTING.

Fruit from narrowly to broadly oblong.

Leaves narrow in outline, generally pinnate.

Fruit puberulent ..... 26. *L. oregonum.*

Fruit glabrous.

Oil tubes more than one in the intervals..... 27. *L. hallii.*

Oil tubes solitary in the intervals.

Flowers deep yellow; leaf segments minute ..... 28. *L. leibergi.*

Flowers pale yellow; leaf segments much longer than the last. 29. *L. martindalei*

Leaves broad in outline, with primary divisions at least ternate.

Leaves rather simply 1 to 3-ternate.

Wings broad.

Oil tubes always solitary in the intervals..... 30. *L. lucigatum.*

Oil tubes mostly more than one in the intervals.

Low dwarf glabrous plants..... 31. *L. cusickii.*

Taller and puberulent..... 32. *L. platycarpum.*

Wings narrow.

Ovaries glabrous..... 33. *L. triternatum.*

Ovaries puberulent.

Ribs filiform ..... 34. *L. robustius.*

Ribs sharp ..... 35. *L. alatum.*

Leaves usually much dissected and with short segments.

Glabrous throughout.

Flowers yellow.

Oil tubes solitary in intervals.

Fruit wings broad ..... 36. *L. grayi.*

Fruit wings narrow ..... 37. *L. torreyi.*

Oil tubes several in intervals.
Petioles with white scarious margins..... 38. *L. sandbergii*
Petioles without white scarious margins.
Fruit narrowly oblong; wings very narrow.. 39. *L. microcarpum*
Fruit broadly oblong; wings broadish..... 40. *L. donnellii*
Flowers not yellow.
Pedicels very short (2 mm. long) ..... 41. *L. lemmonii*
Pedicels elongated (6 mm. or more long).
Involucels wanting..... 42. *L. congdonii*
Involucel bractlets present..... 43. *L. plummerae*
Pubescent throughout.
Ovary and usually the fruit pubescent.
Fruit glabrous..... 44. *L. brevifolium*
Fruit pubescent.
Herbage softly pubescent.
Wings of fruit narrow ..... 45. *L. macdougalii*
Wings of fruit broad ..... 46. *L. jonesii*
Herbage coarsely pubescent.
Fruit wings broad ..... 47. *L. mohavense*
Fruit wings narrow ..... 48. *L. argense*
Ovary and fruit glabrous.
Oil tubes several in all the intervals.
Flowers white..... 49. *L. parishii*
Flowers yellow ..... 50. *L. junipericum*
Oil tubes solitary in all or some of the intervals.
Flowers purple ..... 51. *L. austinae*
Flowers yellow ..... 52. *L. sonnei*
Fruit linear..... 53. *L. bicolor*
PEDUNCLE STOUT, SOMETIMES MUCH SWOLLEN AT THE TOP.
Fruit of medium size.
More or less puberulent..... 54. *L. anomalum*
Glabrous throughout.
Oil tubes several in the intervals..... 55. *L. platyphyllum*
Oil tubes solitary in the intervals..... 56. *L. nudicaule*
Fruit very large.
Ovary glabrous ..... 57. *L. suksdorfii*
Ovary pubescent ..... 58. *L. giganteum*

1. **Lomatium gormani** (Howell) C. & R.

Peucedanum gormani Howell, Fl. N. W. Am. **1**: 252. 1898 [April 1].
Peucedanum confusum Piper, Erythea **6**: 29. 1898 [April 10].

Acaulescent, glabrous or pubescent, 5 to 7.5 cm. high from a shallow globose tuber 2.5 cm. or less in diameter and covered with fascicles of rootlets; leaves bipinnate, the ultimate segments oblong or linear; umbel unequally 1 to 5-rayed, with involucels of a few setaceous bractlets or none; flowers white; fruit sessile or nearly so, rough puberulent, ovate, 6 mm. long, with wings more than half as broad as body, and evident dorsal and intermediate ribs; oil tubes 2 to 6 on the commissural side.

Type locality, on "high hills opposite The Dalles," Oregon; collected by *Howell*, May, 1882; type in Herb. Coulter.

Mountains of eastern Oregon, eastern Washington, and adjacent Idaho.

Specimens examined:

OREGON: Type specimens as cited under type locality.

WASHINGTON: Spokane County, *Leiberg* 750, May, 1891; *Sandberg & Leiberg* 84, in 1893; Pullman, Whitman County, *Piper* 1565, May 24, 1894; Waitsburg, Walla Walla County, *Horner* 4, April 16, 1897; moist rocky plains on the Palouse Hills, Whitman County, *Piper* 73, May, 1897 (type of *Peucedanum confusum* Piper).

IDAHO: Lewiston, Nez Perces County, *A. A. & E. Gertrude Heller* 2967, April 27, 1896.

This species is said to be very common, and the earliest spring flower in the region.

2. **Lomatium geyeri** (Watson) C. & R.

Peucedanum geyeri Watson, Proc. Am. Acad. **14**: 293. 1879.

Peucedanum ciliatum C. & R. Bot. Gaz. **14**: 277. 1889.

Acaulescent, 1 to 4.5 cm. high, from a deep-seated small tuber, glabrous; leaves once or twice ternate then more or less pinnate into linear callous-tipped segments 1 to 5 cm. long; umbel somewhat unequally 8 to 18-rayed, with involucels of numerous purplish lanceolate acuminate united bractlets; rays 2.5 to 5 cm. long; pedicels short, 2 to 3 mm. long; flowers white; fruit oblong, glabrous, 8 to 10 mm. long, 5 mm. broad, with very thin membranous wings more than half as broad as body; oil tubes none.

Type locality, sandy woods and plains, Upper Columbia River, eastern Washington; collected by *Geyer*, no. 458; type in Herb. Gray. Associated with the type in the original description is *Spalding* from Clearwater, Idaho, but this belongs elsewhere.

Eastern Washington and northern Idaho.

Specimens examined:

WASHINGTON: Type specimens as cited under type locality; Spokane County, *Suksdorf* 1205, May, 1889; Yakima, Kittitas, and Spokane counties, *Henderson* 2502, 2503, 2504, May–June, 1892; *Sandberg & Leiberg* 7, in 1893; Spokane County, *Piper* 2300, May 16, 1896.

IDAHO: Lake Pend Oreille, Kootenai County, *Leiberg* 460, March–June, 1892.

Peucedanum geyeri Watson (Bibl. Index) was based on *P. ambiguum* of Hooker, which refers to Geyer's no. 458. The next year Dr. Watson published a detailed description in Proc. Am. Acad. **14**: 293, but this covers more than one species. An examination of the sheet in the Gray Herbarium shows two other species confused with it, both of which were probably collected by Spalding and seem to represent *L. gormani* and *L. farinosum*.

3. **Lomatium hendersonii** C. & R.

Peucedanum hendersonii C. & R. Bot. Gaz. **13**: 210. 1888.

Acaulescent, mostly glabrous, from a shallow constricted tuber 1 to 2.5 cm. in diameter; leaves ternate then bipinnate, ultimate segments short and obtuse; umbel equally 2 to 5-rayed, with involucels of linear acuminate scarious bractlets; rays 1 to 2 cm. long; pedicels 3 to 4 mm. long; flowers white; fruit ovate, glabrous, 5 mm. long, 4 mm.

broad, with thickish narrow wings (not half as broad as body) more or less involute, filiform or nearly obsolete dorsal and intermediate ribs, and a rather prominent ridge on the commissural face; oil tubes solitary in the intervals, 2 on the commissural side; seed face plane.

Type locality, on high hilltops, "John Day Valley," Oregon; collected by *Howell*, B in part, May, 1882; type in Herb. Coulter. Associated with the type in the original description is *Howell* 410, June, 1882, from Lost Valley.

Mountains of eastern Oregon.

Specimens examined:

OREGON: Type specimens as cited under type locality.

4. **Lomatium canbyi** C. & R.

Peucedanum canbyi C. & R. Bot. Gaz. **13**: 78. 1888.

Acaulescent, 7.5 to 20 cm. high, with a short underground stem from a thick more or less elongated rootstock which ends in a globose tuber 1 to 2.5 cm. in diameter; leaves ternate then pinnatifid, the ultimate segments small, with 3 to 5 linear-oblong lobes; umbel equally 5 to 10-rayed, with involucels of narrowly linear scarious-margined bractlets; rays 2.5 to 5 cm. long; pedicels 8 to 12 mm. long; flowers white, with purple anthers; fruit ovate-oblong, glabrous, 8 mm. long, 5 mm. broad, with wings about half as broad as body, and filiform dorsal and intermediate ribs; oil tubes solitary in the intervals (lateral intervals often with 1 or 2 accessory but shorter ones), 2 or 4 on the commissural side.

Type locality, "high ridges, E. Oregon;" collected by *Howell*, no. 67, April, 1880, and May, 1882; type in Herb. Coulter, duplicate in U. S. Nat. Herb. Associated with the type in the original description is *Cusick* 1010, in 1882 and 1884, from Union County.

Stony ground, eastern Oregon and eastern Washington and Idaho.

Specimens examined:

OREGON: Type specimens as cited under type locality; Malheur County, altitude 750 meters, *Leiberg* 2149, May 14, 1896; stony ridges, *Cusick* 1834, May 9, 1898.

WASHINGTON: Klickitat Valley, *Howell* 1367, April 26, 1889; Yakima County, *Fritillaria Club* 23, in 1890; *Whited* 56, May 4, 1896.

IDAHO: On the lower Clearwater River, Nez Perces County, *Sandberg* 150, May 10, 1892.

5. **Lomatium farinosum** (Hook.) C. & R.

Peucedanum farinosum Hook. in Lond. Jour. Bot. **6**: 235. 1847.
Ferula farinosa Geyer, in Hook. Lond. Jour. Bot. l. c.

Short caulescent; root moniliform, with 2 or 3 small rounded tubers; peduncles becoming 3 dm. high, much exceeding the leaves; leaves ternate or biternate (or the divisions sometimes 4 or 5); leaflets linear, 1 to 8 cm. long; umbel small, somewhat unequally rayed, with involucels of several linear acuminate bractlets; rays 2 to 5 cm. long; pedi-

cels slender, 10 to 16 mm. long; flowers white; fruit linear-oblong, glabrous, 6 to 8 mm. long, 2 to 3 mm. broad, with the narrow wings less than half as broad as body; oil tubes several in the intervals.

Type locality, on wet clay "on an isolated rock in the Cœur d'Alene Mountains," Idaho; collected by *Geyer*, no. 325, April.

Eastern Washington and Idaho.

Specimens examined:

WASHINGTON: Near Spangle, Spokane County, *Suksdorf* 1204, May, 1889; *G. R. Vasey* in 1889; *Sandberg & Leiberg* 131, in 1893; Wawawai, Whitman County, *Piper* 1567, May 12, 1894; same station, *Elmer* 98, May, 1897.

IDAHO: Along Hatwai Creek, Nez Perces County, *Sandberg* 82, April 30, 1892; about Lewiston, Nez Perces County, altitude 450 to 600 meters, *A. A. & E. Gertrude Heller* 3036, May 7, 1896.

6. **Lomatium piperi** C. & R., sp. nov.

Dwarf acaulescent, from a deep-seated solitary rounded tuber with frequent clusters of fine rootlets over its surface; leaves 2 to 3-ternate; leaflets linear, usually entire, 1 to 2 cm. long; umbel 1 to 8-rayed, with involucels of few small linear bractlets or none; rays 2.5 to 5 cm. long; flowers white, the ovary with an enlarged disk projecting beyond the top; fruit almost sessile, oblong-elliptical, glabrous, 4 to 8 mm. long, 3 to 4 mm. broad, with wings half as broad as body; oil tubes small, 2 to 4 in the intervals, 4 to 6 on the commissural side; seed face plane.

Type locality, Ellensburg, Spokane County, Wash.; collected by *G. R. Vasey*, May, 1889; type in U. S. Nat. Herb.

From the mountains of northern California to Washington.

Specimens examined:

CALIFORNIA: "Northern Sierra Mountains," *Lemmon*, April–May, 1879.

OREGON: Prairies, eastern Oregon, *Howell*, April, 1880; Lookout Mountains (Sierra Blue Mountains), Crook County, *Cusick* 1687, July 1, 1897.

WASHINGTON: Hillsides, Columbia River, Klickitat County, *Suksdorf*, March–April, 1881; type specimens as cited under type locality; *Whited* 60, May 6, 1896.

L. piperi has heretofore passed as *Peucedanum farinosum*, but as Mr. C. V. Piper has pointed out to us it must be distinct. It is a great pleasure to have this opportunity of associating Mr. Piper's name with a group of plants of his own State in which he has done so much valuable work.

7. **Lomatium watsoni** C. & R.

Peucedanum watsoni C. & R. Bot. Gaz. **13**: 209. 1888.

Acaulescent, 5 to 7.5 cm. high, more or less puberulent, with a short subterranean stem from a deep-seated oblong tuber (with clusters of rootlets over its surface) with or without a thick elongated root below; leaves bipinnate, the ultimate segments short and linear-oblong; umbel unequally 1 to 5-rayed, with involucels of bractlets united nearly to the top; rays from almost wanting to 2.5 cm. long; flowers yellow; fruit sessile or nearly so, ovate, puberulent, 6 mm. long, 3 mm. broad,

with very narrow wings, and filiform or almost obsolete dorsal and intermediate ribs; oil tubes (sometimes wanting) very obscure, 3 to 6 in the intervals, 1 in each rib, and 6 on the commissural side; seed face plane.

Type locality, on denuded hilltops near "Alkali," Oregon; collected by *Howell*, no. 830, May 20, 1882; type in Herb. Coulter, duplicate in U. S. Nat. Herb.

Mountains of Oregon and Washington.

Specimens examined:

OREGON: Type specimens as cited under type locality; Trout Creek, Blue Mountains, *Howell*, May 25, 1885.

WASHINGTON: Simcoe Mountains, *Howell* 180, June, 1881; mountains near Columbus, Klickitat County, *Suksdorf* 1207, April 13, 1886.

Our original description of this species included a second form which Mr. Howell well separated as *Peucedanum gormani*.

8. **Lomatium ambiguum** (Nutt.) C. & R.

Eulophus ambiguus Nutt. Jour. Philad. Acad. **7**: 27. 1834.
Peucedanum ambiguum Nutt. in Torr. & Gray, Fl. **1**: 626. 1840.

Glabrous, from low acaulescent to 3 dm. high and caulescent, with tuberous sometimes moniliform roots; petioles much dilated at base; leaves once to twice pinnate, with more or less elongated linear leaflets, the upper often more dissected; umbel unequally 8 to 18-rayed, with no involucels; rays 2.5 to 8.5 cm. long; pedicels 4 to 8 mm. long; flowers yellow; fruit narrowly oblong, glabrous, 6 to 8 mm. long, 2 mm. broad, very narrowly winged; oil-tubes solitary in the intervals, 2 (broad and thin) on the commissural side.

Type locality, "on the borders of Flat-Head River," Oregon; collected by *Wyeth;* type in Herb. Philad. Acad.

From eastern Oregon to British Columbia, and eastward to Montana and western Wyoming.

Specimens examined:

OREGON: Type specimens as cited under type locality; *Geyer* 298; Blue Mountains, *Nevius*, in 1873 and 1874; Union County, *Cusick* 1099, May–June, 1883; *Henderson* 55, June, 1886; *Sheldon* 8308, in 1897; *Cusick* 2188, in 1898.

WASHINGTON: Hills near Spokane, *Lyall*, in 1861; eastern Washington, *G. R. Vasey* 15, in 1883; Spokane County, *Suksdorf* 319, June 19–28, 1884; *G. R. Vasey* 298, in 1889; Spokane County, *Henderson* 392, June–July, 1892; Pullman, *Piper* 1562, July 20, 1893; *Sandberg & Leiberg* 22, 44, 481, in 1893; Wenatchee, *Whited* 61, May 6, 1896; Spokane and Blue Mountains, Walla-walla County, *Piper* 2299, 2337, May–August, 1896; Blue Mountains, *Horner* 220, July 29, 1897; Pullman, Whitman County, *Elmer* 827, May, 1897.

BRITISH COLUMBIA: Yale, *Macoun*, May–July, 1889.

IDAHO: Kootenai County, *Leiberg* 551, June, 1890; Lake Pend Oreille, *Leiberg* 637, May–July, 1891; along Peter Creek (Nez Perces County) and valley of Spokane River (Kootenai County), *Sandberg* 125, 659, May–July, 1892; Clearwater River, *Henderson*, June, 1894; St. Marys River, *Leiberg* 88, June 27, 1895 Lewiston, Nez Perces County, *A. A. & E. Gertrude Heller* 2995, April 30, 1896; Priest River, *Leiberg* 2817, August 4, 1897; Salubria and Indian Valley, *Jones*, July 10–13, 1899.

MONTANA: Hellgate Canyon, *Watson* 161, August 8, 1880; head waters of Jocko River, *Canby* 151, July 15, 1883; Spanish Basin (Madison Range) and Bridger Mountains, altitude 1,800 to 2,400 meters, *Flodman* 692, 693, 694, July 10–28, 1896; Bridger Mountains, *Rydberg* 4623, June 18, 1897; Forks of Madison, *Rydberg* 4617, July 26, 1897.

WYOMING: Yellowstone Park, *Tweedy* 851, July, 1885; near Crandall Creek, northwestern Wyoming, *Rose* 274, August 29–30, 1893; Druid Peak, Yellowstone Park, *A. & E. Nelson* 5782, July 12, 1899.

9. **Lomatium leptocarpum** (Nutt.) C. & R.

Peucedanum leptocarpum Nutt. in Torr. & Gray, Fl. **1**: 626. 1840.
Peucedanum triternatum leptocarpum Torr. & Gray, l. c.
Peucedanum ambiguum leptocarpum C. & R. Rev. N. Am. Umbell. 59. 1888.

Acaulescent, becoming 3 dm. high, from deep-seated tuberous roots, glabrous; leaves ternate then pinnate, the ultimate segments linear and usually much elongated; umbels with few very unequal rays, and involucels of small linear bractlets; rays from almost wanting to 7.5 cm. long; flowers yellow; fruit nearly sessile, forming a dense cluster, linear, 9 to 10 mm. long, 2 mm. broad, with very narrow wings; oil tubes solitary in the intervals.

Type locality, "plains of the Oregon [Columbia] near the confluence of the Wahlamet;" collected by *Nuttall*, in July; type in Herb. Philad. Acad.

From Oregon and northeastern California to Colorado.

Specimens examined:

CALIFORNIA: Big Valley, Lassen County, *Baker & Nutting*, June 20, 1894.

OREGON: Type specimens as cited under type locality; *Geyer* 557; The Dalles, Wasco County, *Nevius*, in 1871; Union County, *Cusick* 359, May, 1883; Antelope, Wasco County, *Howell* 417, 557, May 10, 1885; near Grizzly Butte, Crook County, altitude 1,040 meters, *Leiberg* 299, June 19, 1894; Elgin, *V. Bailey* 59, May 27, 1896.

IDAHO: Indian Valley, *Jones*, July 15, 1899.

UTAH: Salt Lake City, altitude 1,500 meters, *Watson* 467, May, 1869.

COLORADO: Steamboat Springs, *Alice Eastwood*, July 10, 1891.

10. **Lomatium circumdatum** (Watson) C. & R.

Peucedanum circumdatum Watson, Proc. Am. Acad. **22**: 474. 1887.

Caulescent, with few branches, from a deep-seated constricted tuber, glabrous or puberulent, 3 dm. or less high; leaves ternate then once or twice pinnate; ultimate segments linear, 2 to 12 mm. long; stem leaves with petioles broadly dilated at base; umbel unequally 6 to 12-rayed, with involucels of conspicuous broadly oblanceolate (often united) bractlets, becoming scarious; rays 1 to 8.5 cm. long; pedicels 2 to 4 mm. long; flowers yellow; fruit oblong-elliptical, glabrous, 6 to 8 mm. long, 3 mm. broad, with narrow wings, and very prominent dorsal and intermediate ribs; oil tubes solitary, large, filling the intervals, 4 on the commissural side; seed face concave, with a prominent central ridge.

Type locality, "on hillsides in the Wallowa region of eastern

Oregon;" collected by *Cusick*, no. 1394, June, 1886; type in Herb. Gray, duplicate in U. S. Nat. Herb.

Eastern Oregon and Washington, and adjacent Idaho.

Specimens examined:

OREGON: Type specimens as cited under type locality; near Harper Ranch, Malheur County, altitude 1,000 meters, *Leiberg* 2123, May 23, 1896.

WASHINGTON: Blue Mountains, *Horner* 222, June 11, 1897.

IDAHO: Julietta, Hatwai Creek, and Lake Weha, *Henderson*, April–June, 1894.

In our Revision of 1888 this species was made to include a complex, and is here much more restricted. It is apt to be confused with *L. cous*, but differs in its caulescent habit, stem leaves with much inflated petioles, and glabrous fruit.

11. **Lomatium cous** (Watson) C. & R.

Peucedanum cous Watson, Proc. Am. Acad. **21**: 453. 1886.

Usually acaulescent, glabrous or slightly puberulent, with roughish scapes 5 to 15 cm. high, from a nearly globose tuber (1 to 2.5 cm. in diameter); leaves usually pinnately compound; ultimate segments short linear, entire or few-toothed or cleft; umbels unequally 3 to 10-rayed, with involucels of broadly oblanceolate scariously margined bractlets; rays from nearly wanting to 5 cm. long; pedicels 2 mm. long; flowers yellow; fruit oblong, somewhat puberulent, 6 to 8 mm. long, 3 to 4 mm. broad, with narrow wings, and prominent dorsal and intermediate ribs; oil tubes solitary, large, filling the intervals, 4 to 6 on the commissural side; seed face with central longitudinal ridge.

Type locality, "John Days Valley," eastern Oregon; collected by *Howell*, no. 270, May, 1880; type in Herb. Gray. Associated with the type in the original description are *Howell* 418 from Antelope, and *Cusick* 358 from Union County.

Eastern Oregon and Washington, and adjacent Idaho.

Specimens examined:

OREGON: Sterile stony ridges, Union County, altitude 900 to 1,200 meters, *Cusick* 358, in 1884; Barren Valley, Malheur County, altitude 1,275 meters, *Leiberg* 2199, June 2, 1896; *Cusick* 1837, April 19, 1898.

WASHINGTON: Wawawai, Whitman County, *Elmer* 97, May, 1897.

IDAHO: Lower Clearwater River, Nez Perces County, *Sandberg* 21, April 24, 1892; about Lewiston, Nez Perces County, altitude 450 to 600 meters, *A. A. & E. Gertrude Heller* 3052, May 12, 1896.

12. **Lomatium montanum** C. & R., sp. nov. PLATE IX.

Acaulescent, from a slender or somewhat enlarged and elongated rootstock, glabrous except the slightly puberulent inflorescence, 5 to 20 cm. high; leaves usually twice pinnate, the leaflets short-oblong, obtuse, much crowded; umbel unequally 3 to 8-rayed, with involucels of distinct obovate more or less purplish bractlets; rays 4 to 30 mm. long; pedicels 2 to 4 mm. long; flowers yellow; fruit oblong, glabrous, 5 to 6 mm. long, 2 to 3 mm. broad, with wings about half as broad as body; oil tubes several in the intervals.

LOMATIUM MONTANUM C. & R., sp. nov.

Type locality, mountain ridges in Yellowstone National Park; collected by *Rose*, no. 479, August 19, 1893; type in U. S. Nat. Herb.

On high ridges, from the mountains of eastern Oregon to Wyoming and western Dakotas.

Specimens examined:

OREGON: Higher Wallowa Mountains, *Cusick* 2095*a*, August 23, 1898.

IDAHO: Dry basaltic hillsides, Lewiston, Nez Perces County, *Piper* 2019, May 11, 1895.

MONTANA: Altitude 1,800 to 2,400 meters, *Tweedy*, June, 1888; Grafton, *Williams* 149, June 2, 1892; near Red Lodge, *Rose* 58, July 29, 1893; Little Belt Mountains, near the Pass, altitude 2,100 meters, *Flodman* 696, August, 1896; Bridger Mountains, *Rydberg* 4620, 4624, 4625*a*, 4627, June 14–15, 1897; same station, *Chesnut & Jones* 182, in 1900; near Bozeman, *Chesnut & Jones* 232, 233, in 1900.

WYOMING: Yellowstone Park, *Letterman*, August, 1885; same station, *Tweedy*, in 1885; type specimens as cited under type locality; same station, *Rose* 198, August 14, 1893; northwestern Wyoming, *Rose* 391, 531, 532, August 26–31, 1893; headwaters of Tongue River, Big Horn Mountains, *Tweedy* 57, July, 1898.

NORTH DAKOTA: Little Missouri River, *Canby* 152*a*, June 30, 1883.

EXPLANATION OF PLATE IX.—Photograph of plant taken in the field, furnished by Victor K. Chesnut.

This species has been confused chiefly with *L. cous*, sometimes with *L. circumdatum*, but differs from both in its foliage, rootstock, oil tubes, smaller fruit, etc., and has a much more eastern and high mountain range.

13. **Lomatium utriculatum** (Nutt.) C. & R.

Peucedanum utriculatum Nutt. in Torr. & Gray, Fl. **1**: 628. 1840.

Caulescent or sometimes nearly acaulescent, from cespitose to 3 dm. or more high, from a more or less thickened root, puberulent or glabrous; petioles very broadly dilated; leaves ternately or pinnately decompound, with ultimate segments narrowly linear, 12 mm. or less long; umbel unequally 5 to 20-rayed, with involucels of much dilated mostly obovate often toothed petiolate bractlets; rays 5 cm. or less long; pedicels 4 to 10 mm. long; flowers yellow; fruit broadly elliptical, glabrous, 4 to 10 mm. long, 2 to 7 mm. broad, with wings nearly as broad as body, and prominent dorsal and intermediate ribs; oil tubes large and solitary in the intervals, 4 to 6 on the commissural side, sometimes 2 or 3 very short accessory ones in the dorsal intervals; seed face somewhat concave.

Type locality, "rocky plains, particularly near the confluence of the Wahlamet and Oregon [Columbia] rivers," Oregon; collected by *Nuttall;* type in Herb. Philad. Acad., duplicate in Herb. Gray.

From southern California to British Columbia.

Specimens examined:

CALIFORNIA: *Bigelow*, in 1853–54; Fort Tejon, *Xantus de Vesey* 39, in 1857–58; Mount Diablo, *Brewer* 1128, May 20, 1862; Newcastle, Placer County, *Bolander* 4578, April, 1865; near San Francisco, *Kellogg*, in 1866; same station, *Kellogg & Harford* 1154, 1155, in 1868–69; Sonoma County, *Samuels* 93; *Bridges* 131*a*;

Plumas County, *Mrs. Austin* 57; Folsom, Sacramento County, *K. Curran*; Snow Mountain, Lake County, *Brandegee;* San Bernardino, *G. R. Vasey*, May, 1880; San Jacinto, *Jones* 3172, April 25, 1882; Sierra County, *Lemmon*, June, 1883; San Luis Obispo, *Mrs. R. W. Summers* 355, April 25, 1886; Los Angeles County, *Parish* 1944, June, 1887; Tehachapi, Kern County, *Brandegee* 21, May, 1889; Los Angeles, *Hasse*, April–May, 1892; Delano (Kern County), Bakersfield (Kern County), Alcalde (Fresno County), *Alice Eastwood*, Apr. 5–May 9, 1893; Mount Hamilton, *Rattan* 54, April 11, 1895; Amador County, *Hansen* 1297, March–May, 1896.

OREGON: Type specimens as cited under type locality; Silverton, Marion County, *Hall* 212, in 1871; western Oregon, *Howell*, June, 1880; *Leiberg* 4106, in 1899.

WASHINGTON: Steilacoom, Pierce County, *Lt. Mullen's Exp.;* prairies of Walla Walla, *Wilkes Exped.* 359; *Cooper;* Steilacoom, *Piper* 635, May 27, 1888; Woodlawn, Thurston County, *Henderson* 395, June 20, 1892.

BRITISH COLUMBIA: Oak Bay, Vancouver Island, *Macoun*, May 31, 1887.

14. **Lomatium vaseyi** C. & R.

Peucedanum vaseyi C. & R. Bot. Gaz. **13**: 144. 1888.

Short caulescent, 15 to 20 cm. high, slightly pubescent; petioles wholly inflated; leaves small (2.5 to 5 cm. long), bipinnate, with the small ovate segments irregularly 3 to 5-lobed; umbel equally 2 to 5-rayed, with involucels of obovate petiolulate toothed bractlets; rays 2.5 cm. long; pedicels 2 to 4 mm. long; flowers yellow; fruit broadly oblong, emarginate, glabrous, 12 to 14 mm. long, 8 mm. broad, with wings twice as broad as body, and mostly prominent dorsal and intermediate ribs; oil tubes solitary in the intervals, 4 on the commissural side.

Type locality, "San Bernardino Mountains, California;" collected by *G. R. Vasey*, no. 231, May, 1880; type in U. S. Nat. Herb., duplicate in Herb. Coulter.

On the mesas of southern California.

Specimens examined:

CALIFORNIA: Type specimens as cited under type locality; San Bernardino County, *Parish* 2060, April 10, 1888; Darwin Mesa, Inyo County, altitude 1,800 meters, *Orcutt & Funston* 789, May 20, 1891; dry clay mesas near Colton, San Bernardino County, *Parish* 2157, April–May, 1891.

15. **Lomatium caruifolium** (Hook. & Arn.) C. & R.

Ferula caruifolia Hook. & Arn. Bot. Beechey 348. 1840.
Peucedanum caruifolium Torr. & Gray, Fl. **1**: 628. 1840.
Peucedanum crosum Jepson, Erythea **5**: 1. 1897.

Like *L. utriculatum*, but often more caulescent, puberulent or glabrous, the elongated peduncles 1.5 to 4.5 cm. high; leaf segments 1 to 5 cm. long; bractlets of involucels obovate and occasionally toothed; fruit 6 to 8 mm. long, with wings half as broad as body, and obsolete dorsal and intermediate ribs; oil tubes indistinct, 2 or 3 in the intervals, none on the commissural side.

Type locality, in California; collected by *Douglas;* duplicate type in Herb. Gray.

Central California, chiefly in the Bay Region.

Specimens examined:

CALIFORNIA: *Bigelow*, in 1853–54; *Douglas;* Walnut Creek, Contra Costa County, *Brewer* 1014, April 30, 1862; Sonoma County, *Samuels* 92; *Bridges* 131; Little Oak, Solano County, *Jepson*, May 2–6, 1891; Exeter, Tulare County, *Alice Eastwood*, April 26, 1895.

16. **Lomatium ellipticum** (Torr. & Gray) C. & R.

Peucedanum nudicaule ellipticum Torr. & Gray, Pacif. R. Rep. **2**[2]: 121. 1855.

Caulescent, branching at base, 3 to 4 dm. high, more or less pubescent, from a large root; leaves ternate then once or twice pinnate; the ultimate segments linear-oblong, short, cuspidate; umbel 5 to 12-rayed, with involucels of conspicuous bractlets, as in *L. macrocarpum;* rays 3 to 5 cm. long; pedicels 2 to 6 mm. long; flowers white(?); fruit broadly and bluntly elliptical, glabrous, 16 to 18 mm. long, about 10 mm. broad, with wings 4 mm. broad (broader than body), and rather obscure dorsal and intermediate ribs; oil tubes solitary in the intervals.

Type locality, "Round Valley, near the sources of the Sacramento, in the Sierra Nevada," California; collected by *Snyder* in 1854; type in Herb. Gray.

Central California, in the region of the head waters of the Sacramento.

Specimens examined:

CALIFORNIA: Type specimens as cited under type locality; Feather River, near Marysville, Yuba County, *Bigelow*, in 1853–54.

17. **Lomatium macrocarpum** (Nutt.) C. & R.

Peucedanum macrocarpum Nutt. in Torr. & Gray, Fl. **1**: 627. 1840.
Peucedanum macrocarpum eurycarpum Gray, Proc. Am. Acad. **8**: 385. 1872.
Peucedanum eurycarpum C. & R. Rev. N. Am. Umbell. 61. 1888.

Somewhat caulescent or nearly acaulescent, 1 to 6 dm. high, more or less pubescent, much branched at base, from a more or less elongated thick root; leaves pinnately (or first division ternate) compound; segments pinnately incised, ultimate divisions ovate or short linear; umbel somewhat equally 3 to 10-rayed, with involucels of conspicuous somewhat foliaceous lanceolate or linear bractlets often united and unilateral; rays 2 to 10 cm. long; pedicels 2 to 10 mm. long; flowers white; calyx-teeth evident; fruit linear-oblong to broadly oblong, elliptical or ovate, glabrous, 6 to 20 mm. long, 3 to 7 mm. broad, with wings from very narrow to as broad as body, and filiform dorsal and intermediate ribs; oil tubes solitary in the intervals (often obscure, rarely 2 or 3), 2 or 4 on the commissural side; seed face with a slight central longitudinal ridge.

Type locality, "Barren hills on the Oregon [Columbia];" collected by *Nuttall;* type in Herb. Philad. Acad. A duplicate type of *Peucedanum macrocarpum eurycarpum* Gray (*Hall* 21 from Oregon) is in Herb. Philad. Acad.

From central California through eastern Oregon and Washington to British America, eastward to western Colorado and western Wyoming.

Specimens examined:

CALIFORNIA: Santa Clara Valley, *Peckham*, May 4, 1866; Plumas County, *Mrs. E. P. Jones*, in 1872; Sonoma County, *Samuels* 94; Siskiyou, Plumas, and Sierra counties, *Lemmon*, in 1889; Amador County, *Hansen* 333, May 29, 1895; Santa Clara County, *Jepson*, June 9, 1896; Sisson, Siskiyou County, *Brown*, in 1897.

OREGON: *Hall* 21, in 1871 (type of *Peucedanum macrocarpum eurycarpum* Gray eastern Oregon, *Howell*, in 1880; *Cusick* 37, May, 1883; near Eugene City, Lane County, *Howell* 737, June 28, 1893; Malheur Butte, Malheur County, *Leiberg* 2038, May 12, 1896; Swan Lake Valley, Klamath County, *Applegate* 231, May 24, 1896; *Cusick* 1840, April 25, 1898.

WASHINGTON: W. Klickitat County, *Suksdorf*, May–June, 1883; eastern Washington, *G. R. Vasey*, in 1883; Spokane County, *Suksdorf*, June 20, 1884; *G. R. Vasey* 308, in 1889; Yakima, Franklin, and Whitman counties, *Henderson*, May–July, 1892; *Sandberg & Leiberg* 61, 243, in 1893; Pullman, Whitman County, *Piper* 1563, June 24, 1894; Cleveland, Klickitat County, *Ely*, May, 1895; *Sheldon* 8038, in 1897; Waitsburg, Wallawalla County, *Horner* 221, June 5, 1897; Pullman, Whitman County, *Elmer* 96, May, 1897.

IDAHO: Lower Clearwater River, Nez Perces County, *Sandberg* 52, April 26, 1892; hills near Moscow, *Henderson*, April–July, 1894; Coeur d'Alene Mountains, *Leiberg* 13, June 22, 1895; near Lewiston, Nez Perces County, *A. A. & E. Gertrude Heller* 2970, April 27, 1896.

NEVADA: Near Virginia City, *Bloomer*, February 14, 1864; Trinity and W. Humboldt Mountains, *Watson* 468, May–June, 1868; Palisade, *Jones* 3883, June 14, 1882; Aurum, *Jones*, June, 1891.

COLORADO: Egeria Park, Routt County, *Alice Eastwood*, July 5, 1891.

WYOMING: Yellowstone Park, *Tweedy*, June, 1885; La Barge, Uinta County, *Stevenson*, May–June, 1894; Point of Rocks, Sweetwater County, *Nelson* 3086, June 1, 1897; Yellowstone River, Yellowstone Park, *A. & E. Nelson* 5733, July 9, 1899.

MONTANA: Columbia Falls, *Williams* 148, June–July, 1894.

BRITISH COLUMBIA: Spences Bridge, *Macoun*, May 25, 1889.

ASSINIBOIA: Medicine Hat, *Macoun* 4964, June 1, 1894; Farewell Creek, Cypress Hills, *Macoun* 10694, June 27, 1895; Wood Mountain Post, *Macoun* 10696, July 10, 1895.

ALBERTA: Milk River Bridge, *Macoun* 10693, July 19, 1895.

This abundant and widely distributed species is very constant in its general habit, pubescence, foliage, and striking involucels, but wonderfully variable in its fruit. We have attempted in vain to discover lines of cleavage for segregates, not even different geographical distribution supporting diverse fruit characters. In some forms the linear-oblong fruit is 20 mm. long, but 3 mm. broad, and with very narrow wings; while at the other extreme are small oblong or ovate fruits but 6 mm. long, nearly as broad, and with wings as broad as body. Between the two extremes, however, there seems to be every possible gradation.

18. **Lomatium dasycarpum** (Torr. & Gray) C. & R.

Peucedanum dasycarpum Torr. & Gray, Fl. **1**: 628. 1840.
Peucedanum pringlei C. & R. Bot. Gaz. **13**: 209. 1888.

Very short caulescent or acaulescent, with several stout peduncles 1.5 to 3 cm. high from a common root, tomentose pubescent; leaves

rather small, pinnately decompound, with numerous short linear segments; umbel somewhat equally 6 to 15-rayed, with involucels of linear to ovate more or less tomentose bractlets; rays 2.5 to 7.5 cm. long; pedicels 6 to 10 mm. long; flowers white; fruit nearly orbicular, coarsely pubescent (sometimes becoming almost glabrous), 8 to 14 mm. long, 7 to 12 mm. broad, with thin membranous wings broader than the body, and filiform dorsal and intermediate ribs; oil tubes large and solitary in the intervals (an occasional secondary one in the lateral intervals), 4 on the commissural side; seed deeply sulcate beneath the oil tubes, with plane face.

Type locality, "California;" collected by *Douglas;* type in Herb. Gray.

Southern California.

Specimens examined:

CALIFORNIA: *Bigelow*, in 1853–54; type specimen as cited under type locality; Angel Island, *G. R. Vasey*, in 1875; Cuyamaca Mountains, *G. R. Vasey* 230, May, 1880; San Luis Obispo County, *Mrs. Summers* 356, April 25, 1882; San Diego County, *Pringle*, May 4, 1882; San Diego, *Jones* 3088, March 20, 1882; Santa Ysabel, San Diego County, *Henshaw*, April 8–24, 1893; Los Angeles County, *Hasse*, May 21 1893; Saugus, Los Angeles County, *Canby*, in 1894; near San Diego, *Rutter* 53, April 11, 1895; Cuyamaca Mountains, altitude 1,380 meters, *Parish* 4419, June 5–7, 1897.

19. **Lomatium tomentosum** (Benth.) C. & R.

Peucedanum tomentosum Benth. Pl. Hartw. 312. 1849.

More or less densely villous-tomentose, somewhat caulescent or scarcely so, about 3 dm. high; leaves finely dissected into narrow or filiform segments; umbel with 4 to 8 equal rays, and involucels of linear to lanceolate or ovate acuminate bractlets; rays (fertile) 2.5 to 7.5 cm. long; pedicels 6 to 12 mm. long; flowers white; calyx teeth evident; fruit ovate to orbicular, densely tomentose, 10 to 18 mm. long, 6 to 10 mm. broad, with thickish wings from not quite as broad as body to broader, and prominent dorsal and intermediate ribs (concealed by the tomentum); oil tubes mostly 3 in the intervals, 4 on the commissural side; seed face somewhat concave.

Type locality, "in annibus exsiccatis fluviorum vallis, Sacramento," Cal., collected by *Hartweg*, no. 257 (but sent out as no. 1751), in 1846–47; type in Herb. Kew, duplicate in Herb. Gray.

California, from the bay region to Siskiyou County.

Specimens examined:

CALIFORNIA: San Luis Obispo, *Brewer* 461, April, 1861; Ukiah, Mendocino County, *Bolander* 3967, in 1864; Sausalito, Marin County, *Kellogg & Harford* 1156, May 20, 1868; Chico, Butte County, *Mrs. R. M. Austin*, May, 1883; Contra Costa County, *Greene*, May, 1889; Little Chico Creek, Butte County, *Mrs. R. M. Austin* 269, May, 1896; Sisson, Siskiyou County, *Brown*, in 1897; Mission Hills, San Francisco, *Alice Eastwood*, May 20, 1898.

20. **Lomatium orientale** C. & R., sp. nov.

Peucedanum nudicaule Nutt. in great part, and of all later authors.

Acaulescent or shortly caulescent, with short and soft pubescence, peduncles 1 to 3 cm. high, and a thick elongated root (often swollen in places); leaves bipinnate, the small oblong segments entire or toothed; umbel unequally 5 to 8-rayed, with involucels of scarious-margined (often purplish) lanceolate distinct bractlets; rays 1 to 3.5 cm. long; pedicels glabrous, 5 to 7 mm. long; flowers white or pinkish, with glabrous ovaries; fruit almost round, emarginate at base, glabrous, 5 mm. long, 4 mm. broad, with wings not as broad as body, and indistinct or obsolete dorsal and intermediate ribs; oil tubes solitary in the intervals (rarely 2 in the lateral intervals), 4 on the commissural side; seed face plane.

Type locality, plains around Denver, Colo.; collected by *Bethel*, May, 1895; type in U. S. Nat. Herb.

On the plains from North Dakota to Kansas, and west to Arizona and Washington.

Specimens examined:

KANSAS: Western Kansas, *Herb. State Agric. Coll.*

NEBRASKA: *Wilcox*, in 1887; Long Pine, Brown County, *Rutter*, June 1, 1893.

SOUTH DAKOTA: Aurora County, *Wilcox*, May 20, 1892.

MONTANA: *Blankinship*, May 3–4, 1890; Warm Peak, Bear Lodge, *V. Bailey*, June 8, 1894.

WYOMING: Fort Russell, *Ruby*, in 1885; Cheyenne, *Harard*, in 1893; Laramie plains, *Nelson*, May, 1893 and 1894.

COLORADO: *Hall & Harbour* 212, in 1862; Palmer Lake, *Alice Eastwood*, May 25, 1890; Cache la Poudre, *Coren*, May 23, 1891; foothills, altitude 1,800 to 1,950 meters, *Crandall*, May, 1893 and 1894; near Windsor, *Osterhout*, May, 1894; plains about Denver, *Bethel*, May, 1895; Log Canyon and Rist Canyon, *Holzinger* 3, May 31, 1896.

NEW MEXICO: Mangus Springs, *Rusby* 148, February 25, 1880.

ARIZONA: *MacDougal* 5, June, 1891; Flagstaff, altitude 1,650 meters, *MacDougal* 5, May 31, 1898; Clifton, *Davidson*, in 1899.

UTAH: *Palmer* 181, in 1877.

IDAHO: *Allen*, in 1873; boundary of Idaho and Washington, *Cusby*, in 1891.

In 1818 Nuttall transferred Pursh's *Smyrnium nudicaule* to *Ferula*, and cited with the type of Pursh (a *Lewis & Clark* plant from the Columbia River) a more eastern plant, "on the high plains of the Missouri, commencing about the confluence of the river Jauk [Jaune = Yellowstone or Jacque = Dakota]," a plant said by Nuttall to be associated on the eastern plains with *L. foeniculaceum*. Since then the name *nudicaulis* has been associated with the plant of the eastern plains. It was a puzzle to us to find that the type locality of *Smyrnium nudicaule* was entirely to the west of its present range, but Messrs. Robinson and Greenman have cleared up the matter by examining Pursh's type, and discovering that it is the same as the abundant *Sesli leiocarpum* of Hooker, from the same region. This leaves the eastern plant without a name.

21. **Lomatium nevadense** (Watson) C. & R. FIG. 60.

Peucedanum nevadense Watson, Proc. Am. Acad. **11**: 143. 1876.

Glaucous, puberulent, short caulescent, peduncles 1 to 4 dm. high; leaves pinnately decompound, with small segments; umbel unequally

5 to 10-rayed, with involucels of scarious-margined linear-lanceolate bractlets sometimes toothed and usually distinct; rays 1 to 5 cm. long; pedicels pubescent, 4 to 10 mm. long; flowers white, with pubescent ovary; fruit round to ovate, somewhat pubescent, 6 to 10 mm. long, 4 to 8 mm. broad, with wings almost as broad as body, and evident dorsal and intermediate ribs; oil tubes 3 or 4 in the intervals, 4 to 6 on the commissural side.

Type locality, Unionville, Nevada, altitude 1,500 meters; collected by *Watson*, no. 469, June, 1868; type in U. S. Nat. Herb.

From the mountains of southeastern Oregon and eastern California to Nevada and Arizona.

Specimens examined:

OREGON: Near Button Springs, Lake County, altitude 1,470 meters, *Leiberg* 361, June 30, 1894; near Harpers Ranch, Malheur Divide, altitude 240 to 570 meters, *Leiberg* 2107, 2145, 2205, May 22–June 5, 1896.

CALIFORNIA: "Upper Sacramento," *Parkinson;* Sierra Nevada, *Lemmon*, in 1875; near Truckee, Nevada County, *Sonne*, May–July, 1886, 1887, and 1895.

NEVADA: Near Virginia City, *Bloomer*, March–April, 1863–64; type specimens as cited under type locality; Carson City, altitude 1,500 meters, *Watson* 469, April, 1868; Empire city, Ormsby County, *Jones* 3879, 3880, May 23–June 19, 1882; Reno and Verdi, Washoe County, *Sonne*, June, 1890; same station, *Hillman* in 1890.

UTAH: Silver Reef, altitude 1,350 meters, *Jones* 5163, May 4, 1894.

ARIZONA: Peach Springs, Mohave County, *Lemmon* 125, May, 1884; Tucson Mountains, *Toumey* 191, April 8, 1892; near Pagumpa, altitude 1,200 meters, *Jones* 5099, April 23, 1894.

Formerly confused with *L. nudicaule*, from which it may be readily distinguished by its pubescent pedicels, ovaries, and fruit, all of which are glabrous in *L. nudicaule*. Also the range of *L. nevadense* is farther west, in the Sierra Nevada region, while *L. nudicaule* belongs more especially to the plains and more eastern foothills.

Lomatium nevadense cupulatum (Jones) C. & R.

Peucedanum nevadense cupulatum Jones, Contr. to Western Botany no. 8: 29. 1898.

Involucels of bractlets united into a cup with hyaline margin, 6 to 8 mm. long; oil tubes 8 or 9 on the commissural side.

Type locality, gravelly mesas, "Reno, Nevada," altitude 1,500 meters; collected by *Jones*, June 19, 1882, and April 22, 1897; type in Herb. Jones.

Only known from the type locality.

Specimens examined:

NEVADA: Type locality, *Sonne* 3, June, 1890.

22. **Lomatium daucifolium** (Nutt.) C. & R.

Peucedanum daucifolium Nutt. in Torr. & Gray, Fl. 1: 627. 1840.
Peucedanum foeniculaceum daucifolium Torr. & Gray, l. c.
Peucedanum villosum Nutt. in Bot. King Surv. 131. 1871, in part.
Peucedanum foeniculaceum of later authors, not Nutt.

At first very tomentose, becoming more or less glabrate, with peduncles 1 to 2 dm. long; leaves very finely dissected, ternate then pin

nately decompound into short filiform segments; umbel rather unequally 3 to 12-rayed, with gamophyllous involucels, 5 to 7-cleft, and with conspicuously hairy margins; rays 2.5 to 7.5 cm. long; pedicels 6 to 10 mm. long; flowers yellow, the ovary glabrous; fruit broadly oblong, glabrous, 5 to 8 mm. long, 4 mm. broad, with wings half as broad as body, and prominent dorsal and intermediate ribs; oil tubes 1 to 3 in the intervals, 2 to 4 on the commissural side.

Type locality, "on the Platte," near Independence, Jackson County, Mo.; collected by *Nuttall;* type in Herb. Philad. Acad.

On the plains, from Nebraska, through Kansas and Missouri, to eastern Texas; perhaps with more northern extension.

Specimens examined:

NEBRASKA: Wymore, Gage County, *Williams* 132, May 25, 1888.

KANSAS: Miami County, *Oyster*, April, 1883; Manhattan, *Bassler*, May 4, 1889; Onaga, *Cereceaur*, June, 1892 and 1893; Osborne County, *Shear* 40, May 19, 1894.

MISSOURI: Type specimens as cited under type locality; Jackson County, *Bush* 322, 543, April–May, 1894 and 1896.

INDIAN TERRITORY: Limestone Gap, *Butler*, April, 1876.

OKLAHOMA: Huntsville, Kingfisher County, *Laura Blankinship*, April 16–31, 1896.

TEXAS: Dallas, *Woolson* 91, in 1873; same station, *Reverchon* 361, March–April, 1881.

23. **Lomatium foeniculaceum** (Nutt.) C. & R.

Ferula foeniculacea, Nutt. Gen. **1**: 183. 1818.
Lomatium villosum Raf. Jour. Phys. **89**: 101. 1819.
Cogswellia villosa Spreng. in Roem. & Schult. Syst. **6**: 588. 1820.
Peucedanum foeniculaceum Nutt. in Torr. & Gray, Fl. **1**: 627. 1840.

Acaulescent, at first densely villous but becoming more or less glabrate, 1 to 3 dm. high; leaves finely dissected, ternate then pinnately decompound, with very numerous narrow crowded segments; umbel somewhat equally 5 to 15-rayed, with involucels of conspicuous lanceolate more or less united and usually very tomentose bractlets; rays 2 to 4 cm. long; pedicels 2 to 6 mm. long; flowers yellow, the ovaries densely pubescent; fruit orbicular to oblong, somewhat pubescent, 5 to 8 mm. long, 4 to 5 mm. broad, with wings half as broad as body; oil tubes 3 or 4 in the intervals, 4 on the commissural side; seed face plane.

Type locality, "on the high plains of the Missouri, commencing about the confluence of the river Jauke [Yellowstone?];" collected by *Nuttall;* type not in Herb. Philad. Acad., and possibly lost.

From the plains of Assiniboia to Texas.

Specimens examined:

ASSINIBOIA: Medicine Hat and Cypress Hills, *Macoun* 5002, 5003, May–June, 1894.

WYOMING: Sheridan County, *Tweedy* 2427, July, 1899.

NORTH DAKOTA: "Bad Lands," Little Missouri, *Canby* 150, June 30, 1883; Fort Buford, *Havard*, May, 1889.

SOUTH DAKOTA: Black Hills, near Fort Meade, *Forwood* 145, May 6, 1887; Black Hills, Hot Springs, *Rydberg* 728, June 15, 1892; Alkali Creek, *V. Bailey* 18, June 3 1894.

NEBRASKA: "Plains of the Platte," *Nuttall* (type of Nuttall's *Peucedanum villosum*).

KANSAS: Onaga, *Crevecœur*, June 5, 1893.

TEXAS: Eagle Pass, *Havard*.

24. **Lomatium vaginatum** C. & R., sp. nov.

Short, caulescent, from an elongated more or less thickened root, 3 to 4 dm. high, often spreading from the base, somewhat scabrous throughout; leaves rather broad, ternate then once to twice pinnate, ultimate segments short and obtuse, often more or less confluent; petioles a large inflated purple sheath; umbels somewhat unequal, 5 to 12-rayed, with a single involucral bract, and involucels of numerous linear elongated acuminate bractlets; rays 2 to 6 cm. long; pedicels 4 to 7 mm. long; flowers pale yellow; fruit broadly oblong, somewhat scabrous, 8 to 10 mm. long, with wings nearly as broad as body; oil tubes large, 2 or 3 in the intervals.

Type locality, Logan Valley, Union County, Oreg.; collected by *W. C. Cusick*, no. 1697; type in U. S. Nat. Herb.

Eastern Oregon.

Specimens examined:

OREGON: Type specimens as cited under type locality; near Grizzly Butte, Crook County, altitude 1,425 meters, *Leiberg* 234, June 14, 1894; Malheur Divide, *Leiberg* 2160, May 30, 1896; near Beulah, Malheur County, *Leiberg* 2293, June 17, 1896.

CALIFORNIA: Yreka, Siskiyou County, *Greene* 788, May 15, 1876.

Mr. Cusick has distributed this species as *Peucedanum donnellii*, but the fruit wings are broader than in that species.

25. **Lomatium marginatum** (Benth.) C. & R.

Peucedanum marginatum Benth. Pl. Hartw. 312. 1849.

Tall (at least 3 dm. high) and somewhat caulescent, glabrous; leaves large, much compounded into long linear segments; fruiting rays few, much elongated, 5 cm. long; pedicels slender, 10 to 12 mm. long; involucral bracts linear, elongated, acuminate, somewhat scarious margined; fruit immature, elliptical oblong, glabrous.

Type locality, "in valle Sacramento;" collected by *Hartweg*, no. 1752, duplicate in Herb. Gray.

Central California.

Specimens examined:

CALIFORNIA: Type specimens as cited under type locality.

Brewer's no. 4536 (1865), from the banks of the American River, California, must be very near this species. The only striking difference is the much smaller bractlets.

In the Botany of California *Peucedanum marginatum* is referred to *P. caruifolium*, where it has ever since remained. A careful comparison of the Douglas plant, which is the type of the former, and the Hartweg plant, which is the type of the latter, convinces us that the two are very distinct. *P. marginatum* is a much stronger plant, with very different bractlets, longer peduncels, and doubtless larger fruit, etc. No

material, however, has been seen except that of Hartweg's collection, made more than fifty years ago. The attention of Californian botanists is called to the desirability of collecting a full series of this species.

26. **Lomatium oreganum** C. & R.

Peucedanum oreganum C. & R. Rev. N. Am. Umbell. 64. 1888.

A very much reduced cespitose plant from a multicipital caudex, pubescent throughout; leaves narrow in outline, once to twice pinnate, alternate segments short, ovate to linear-ovate, apiculate; peduncles slender and weak, longer than the leaves, 2.5 to 10 cm. long; umbels simple, or of two small umbellets (one sessile), with involucels of linear green bractlets; pedicels of sterile flowers 2 to 3 mm. long, fruiting pedicels fewer and shorter; fruit 3 to 4 mm. long, broadly oblong, pubescent, with narrow wings; calyx teeth present.

Type locality, "Alpine rocks, Blue and Eagle Creek Mountains," Oregon; collected by *W. C. Cusick*, no. 1390, August, 1886–1888; type in Herb. Coulter, fragments in U. S. Nat. Herb.

Specimens examined:

OREGON: Type specimens as cited under type locality; also cliffs of Blue Mountains, head of Anthonys Creek (said by *Cusick* to be the exact locality of the type specimens), altitude 2,400 meters, *Cusick* 2217, July 19–September 14, 1899.

27. **Lomatium hallii** (Watson) C. & R.

Peucedanum hallii Watson, Proc. Am. Acad. **11**: 141. 1876.

Short caulescent, with elongated peduncles 1.5 to 4 dm. high, glabrous; leaves pinnate, oblong in outline, the ovate segments about 1 cm. long, deeply toothed or pinnatifid; umbel equally 3 to 6-rayed, with involucels of small bractlets; rays about 2.5 cm. long; pedicels 6 to 8 mm. long; flowers yellow; fruit broadly elliptical, glabrous, 6 mm. long, 4 mm. broad, with filiform dorsal and intermediate ribs; oil tubes 3 in the intervals, 4 to 6 on the commissural side.

Type locality, "northern Oregon;" collected by *Hall*, no. 211; type in Herb. Gray.

Alpine in northern Oregon and Washington.

Specimens examined:

OREGON: Mount Hood, about timber line, *Howell* 738, August 9, 1893.

28. **Lomatium leibergi** C. & R., sp. nov.

Very short caulescent, glabrous throughout, from a caudex which becomes large and multicipital; peduncles 2 to 3 dm. high, exceeding the leaves; leaves bright green, narrow in outline, 1 to 1.5 dm. long, bipinnate; pinnae 6 or 7 pairs, ovate to oblong, lowest pair somewhat elongated; ultimate divisions small, ovate, pinnately lobed or toothed; umbel rather equally few-rayed, with involucels of linear elongated distinct bractlets; rays 12 to 18 mm. long; pedicels 2 to 4 mm. long; flowers deep yellow; fruit (immature) narrowly oblong, 5 mm. long, with narrow wings.

Type locality, Oregon; collected by *Leiberg*, no. 4166, in 1899; type in U. S. Nat. Herb.

Only known from type locality.

Specimens examined:

OREGON: Type specimens as cited under type locality.

29. **Lomatium martindalei** C. & R.

Peucedanum martindalei C. & R. Bot. Gaz. **13**: 142. 1888.

Resembling *L. hallii* in habit and foliage, but differing in leaves, sometimes bipinnate, with toothed or pinnatifid segments; fruit 8 to 16 mm. long, 7 mm. broad, with wings much broader than body (which is but 2 mm.), and prominent dorsal and intermediate ribs; oil tubes solitary in the intervals, 2 on the commissural side; seed face somewhat concave, with central longitudinal ridge.

Type locality, "rocky places, Cascade Mountains, Oregon;" collected by *Howell*, May–June, 1880; type in Herb. Coulter.

Mountains of Oregon.

Specimens examined:

OREGON: Near Corral Spring, Klamath County, altitude 1,630 meters, *Leiberg* 609, August 2, 1894; Crater Lake, altitude 1,900 to 2,200 meters, *Coville & Leiberg* 369, 382, 387, August 13–14, 1896; same station, altitude 2,400 meters, *Gorman* 479, 480, August 20–21, 1896.

Lomatium martindalei angustatum C. & R.

Peucedanum martindalei angustatum C. & R. Bot. Gaz. **13**: 143. 1888.

Usually more caulescent and sometimes taller, with more dissected leaves, and wings of fruit but 1 mm. wide, making a fruit 4 mm. wide.

Type locality, rocky places, "Cascade Mountains," Oregon; collected by *Howell*, in 1880; type in Herb. Coulter, duplicate in U. S. Nat. Herb.

Mountains of Oregon, Washington, and British Columbia.

Specimens examined:

OREGON: Type specimens as cited under type locality; at timber line on Mount Hood, altitude 1,800 to 2,100 meters, *Merriam*, in 1896; Mount Jefferson, altitude 1,800 meters, *Coville & Applegate* 1171, August 25, 1898.

WASHINGTON: Near Ellensburg, Kittitas County, *C. R. Vasey* 392, August, 1889; Olympia Mountains, *Piper* 879, September 30, 1890; Skamania County, *Suksdorf* 2112, May–August, 1892; Cascade Mountains (altitude 990 meters) and Mount Adams (altitude 1,800 meters), *Henderson* 2514, 2575, July–August, 1892; *Sandberg & Leiberg* 745, in 1893; Mount Rainier, altitude 2,100 meters, *Piper* 2008, August, 1895; Goat Mountains (Cascades), altitude 1,500 meters, *Allen* 258, in 1896.

BRITISH COLUMBIA: Mount Mark, Vancouver Island, altitude 900 meters, *Macoun*, July 25, 1887.

Perhaps too near *Lomatium hallii*, but no intergrades have yet been found.

30. **Lomatium laevigatum** (Nutt.) C. & R.

Peucedanum laevigatum Nutt. in Torr. & Gray, Fl. **1**: 627. 1840.

Resembling *L. triternatum*, but completely glabrous, about 3 dm.

high, with triternate leaves and much reduced leaflets or segments, the latter but 6 to 18 mm. long and 1 mm. wide; pedicels 8 to 10 mm. long; fruit 8 to 10 mm. long, 3 to 4 mm. broad, with wings as broad as body.

Type locality, "Blue Mountains of Oregon;" collected by *Nuttall;* type in Herb. Philad. Acad.

Along the Upper Columbia in Oregon and Washington.

Specimens examined:

OREGON: Type specimens as cited under type locality; bluffs of the Columbia at Grants, *Howell* 1505, April, 1889.

WASHINGTON: Rocky river bank near Columbus, Klickitat County, *Suksdorf* 863, April–June, 1886.

31. **Lomatium cusickii** (Watson) C. & R.

Peucedanum cusickii Watson, Proc. Am. Acad. **21**: 453. 1886.

Dwarf, caulescent, cespitose, glabrous, from a thick elongated root; stems 4 to 12.5 cm. high; leaves once to twice ternate, the segments with 3 to 5 linear acute lobes from 6 to 24 mm. or more long; umbel with 1 to 3 short fertile rays, and involucels of narrow acuminate bractlets distinct or more or less united; pedicels very short; flowers white; fruit oblong-elliptical, 8 to 12 mm. long, the thin wings as broad as the body or narrower; oil tubes 1 to 3 in the intervals, 4 or 6 on the commissural side; seed face concave.

Type locality, "on the highest summits of the Eagle Creek Mountains [altitude 2,700 meters], Union County, Oreg.;" collected by *Cusick*, no. 1280, September, 1885; type in Herb. Gray, duplicate in U. S. Nat. Herb.

High mountains of eastern Oregon.

Specimens examined:

OREGON: Type specimens as cited under type locality; Powder River Mountains, altitude 2,400 meters, *Piper* 2333, August, 1896; Blue Mountains, *Cusick* 1776*a*, in 1897.

32. **Lomatium platycarpum** (Torr.) C. & R.

Peucedanum triternatum platycarpum Torr. Stansb. Rep. 389. 1852.
Peucedanum simplex Nutt. Bot. King Surv. 129. 1871.

Caulescent or acaulescent, puberulent, often tall and stout; leaves ternate or biternate; leaflets from very narrowly linear (almost filiform) to linear-lanceolate, 5 to 10 cm. long; umbel unequally 3 to 15-rayed, with involucels of lanceolate or setaceous bractlets; rays 1 to 7.5 cm. long; pedicels 2 to 6 mm. long; flowers yellow; fruit broadly oblong to nearly orbicular, sometimes emarginate at each end, 6 to 12 mm. long, 4 to 10 mm. broad, with wings broader than body (also extending below body), and prominent dorsal and intermediate ribs; oil tubes large and solitary in the intervals, 2 on the commissural side; seed face slightly concave.

Type locality, Stansburys Island, Salt Lake, Utah; collected by *Stansbury Exped.;* type in Herb. Columbia Univ.

From Utah and western Colorado to western Montana and eastern Washington.

Specimens examined:

UTAH: Wasatch Mountains, altitude 2,100 meters, *Watson* 465, June, 1869; Utah Valley, altitude 1,500 meters, *Jones* 1678, May 3, 1880; Springville, *Jones*, June 3, 1898.

COLORADO: Fort Lewis, southwestern Colorado, *Alice Eastwood* 21, June 10, 1890; Glenwood Springs, *Osterhout*, June, 1895.

WYOMING: Yellowstone Park, *Tweedy*, June, 1885; same station, *Rose* 169, 232, August 10–19, 1893; same station, *Burglehaus*, July, 1893; La Barge, Uinta County, *Stevenson*, June–July, 1894; Evanston, Uinta County, *Nelson* 2967, May 28, 1897; Mammoth Hot Springs, Yellowstone Park, *A. & E. Nelson* 5592, June 30, 1899.

MONTANA: Belt River, *Williams* 10, May–July, 1881; Helena, *Kelsey* 260, May 16, 1887; *Tweedy*, in 1889; near Red Lodge, *Rose* 15, July 26, 1893; Spanish Basin, *Rydberg* 4621, June 24, 1897.

IDAHO: *Wilcox*, in 1883; near Pocatello, *Palmer* 48, May 17, 1893; near Lewiston, Nez Perces County, *Henderson*, April–June, 1894; Big Camas Prairie, altitude 1,500 meters, *Henderson* 3177, July 14, 1895.

OREGON: High ridges, eastern Oregon, *Howell* 182, June, 1880; *Cusick* 1171, in 1884; Pine Creek, Gilliam County (altitude 490 meters), Farewell Bend, Crook County (altitude 1,270 meters), and near Fort Klamath (altitude 1,470 meters), *Leiberg* 168, 432, 655, June–August, 1894.

WASHINGTON: North Yakima, Yakima County, *Palmer*, in 1890; same station, *Henderson* 2513, May–July, 1892; Waitsburg, Walla Walla County, *Horner* 223, June 12, 1897.

33. **Lomatium triternatum** (Pursh) C. & R.

Seseli triternatum Pursh, Fl. **1**: 197. 1814.
Peucedanum triternatum Nutt. in Torr. & Gray, Fl. **1**: 626. 1840.

Caulescent or acaulescent, puberulent, 3 to 7.5 dm. high; leaves biternate to triternate; leaflets from narrowly linear to linear-lanceolate, 5 to 10 cm. long; umbel unequally 5 to 18-rayed, with involucels of lanceolate or setaceous bractlets; rays 1 to 5 cm. long; pedicels 2 to 4 mm. long; flowers deep yellow; fruit narrowly oblong, glabrous, 6 to 12 mm. long, 3 to 4 mm. broad, with narrow wings and somewhat prominent dorsal and intermediate ribs; oil tubes very large and broad, solitary in the intervals, 2 on the commissural side; seed face very slightly concave.

Type locality, "on the waters of Columbia River," Oregon or Washington, or, according to Dr. Coues, "on the main Kooskooskee;" collected by *Lewis;* type (leaves only) in Herb. Philad. Acad. (*fide* Robinson & Greenman).

From northeastern California to British Columbia.

ILLUST. Hook. Fl. Bor. Am. **1**: 264. pl. 94. 1834.

Specimens examined:

CALIFORNIA: Cisco, Plumas County, *Mrs. R. M. Austin.*

OREGON: Klamath Valley, altitude 1,260 meters, *Cronkhite* 43, in 1864; Silverton, Marion County, *Hall* 214, in 1871; *Howell*, June, 1880; near Rock Creek, Morrow County, altitude 1,040 meters, *Leiberg* 87, May 22, 1894; Klamath

County, *Applegate* 232, March 31, 1896; Malheur County, altitude 1,100 to 1,200 meters, *Leiberg* 2143, 2154, May 27–28, 1896; near Harney, Blue Mountains, *Coville* 525, July 10, 1896; *Sheldon* 8342, in 1897; *Cusick* 1852, April–June, 1898.

WASHINGTON: Upper Columbia and Puget Sound, *Wilkes Exped.* 296; E. Wash., *G. R. Vasey*, in 1883; Spokane County, *Suksdorf*, June 23, 1884; *G. R. Vasey* 299, in 1889; Pierce County, *Smith*, May, 1890; *Whited*, March–May, 1896; Goat Mountains (Cascades), altitude 900 to 1,500 meters, *Allen* 257, June–September 1896; Pullman, Whitman County, *Elmer* 846, May, 1897; between Olympia and Gate City (Thurston County) and near Satop (Chehalis County), *A. A. & E. Gertrude Heller* 4056, 4060, July 15–19, 1898.

IDAHO: Coeur d'Alene Mountains, *Leiberg* 403, July 28, 1895; Paradise Creek, Moscow, *Henderson* 4598, June 6, 1897.

WYOMING: Yellowstone National Park, *Burglehaus*, May, 1893.

BRITISH COLUMBIA: Lytton, *Macoun* 13, April 17, 1889.

34. **Lomatium robustius** C. & R.

Peucedanum triternatum macrocarpum C. & R. Rev. N. Am. Umbell. 70. 1888. Not *Peucedanum macrocarpum* Nutt.

Peucedanum triternatum robustius C. & R. Contr. Nat. Herb. **3**: 228. 1895.

Very stout, caulescent, and the caudex becoming multicipital; leaves much as in the broader leaved forms of *L. triternatum;* umbel unequally 5 to 10-rayed, with involucels of linear or setaceous bractlets; rays 2 to 6 cm. long; pedicels 2 to 4 mm. long; flowers yellow, with puberulent ovaries becoming more or less glabrate in fruit; fruit oblong, 12 mm. long, 5 mm. broad, with wings half as broad as body; oil tubes solitary in the intervals.

Type locality, low grounds, W. Klickitat County, Wash.; collected by *Suksdorf*, no. 502, May–July, 1883; type in U. S. Nat. Herb.

Eastern Washington and Oregon.

Specimens examined:

WASHINGTON: Type specimens as cited under type locality.

OREGON: Dalles, *Kellogg*, June, 1869; prairies, Hood River, *Henderson* 390, May–August, 1883; near Grizzly Butte, Crook County, altitude 1,040 meters, *Leiberg* 297, June 19, 1894.

35. **Lomatium alatum** C. & R.

Peucedanum triternatum alatum C. & R. Rev. N. Am. Umbell. 70. 1888.

Caulescent and puberulent; leaves ternate then once or twice pinnate, with very narrowly linear and elongated rather numerous crowded segments 1 to 6 cm. long; umbel unequally 5 to 10-rayed, with no involucels; rays 2 to 6.5 cm. long; pedicels 4 to 7 mm. long, flowers yellow, with puberulent ovaries becoming more or less glabrate in fruit; fruit oblong, 10 to 12 mm. long, with wings more than half as broad as body, and prominent sharp or even slightly winged dorsal and intermediate ribs; oil tubes large and solitary in the intervals.

Type locality, "Folsom," Sacramento County, Cal.; collected by *M. K. Curran*, April, 1884; type in Herb. Coulter.

Eastern Oregon and northeastern California.

Specimens examined:

OREGON: "Gulches and vernal stream banks;" Union County, *Cusick* 1098, June, 1883.

CALIFORNIA: Type specimens as cited under type locality; Modoc County, *Jones*, June, 1884.

36. **Lomatium grayi** C. & R.

Peucedanum millefolium Watson, in Bot. King Surv. 129. 1871. Not Sonder, 1861–1862.

Peucedanum grayi C. & R. Bot. Gaz. **13**: 209. 1888.

Glabrous throughout, with peduncles 7.5 to 22.5 cm. long; leaves ternate then pinnately decompound, the ultimate segments linear-filiform, elongated or short, cuspidate, exceedingly numerous; umbel rather equally 6 to 16-rayed, with involucels of distinct linear subulate bractlets; rays 2.5 to 7.5 cm. long; pedicels 10 to 16 mm. long; flowers yellow; fruit oblong, 8 to 16 mm. long, 5 to 9 mm. broad, with wings usually more than half as broad as body, and filiform dorsal and intermediate ribs; oil tubes usually solitary in the intervals (sometimes 2 in the lateral intervals), 2 or 4 on the commissural side.

Type locality, "Antelope Island, [Great] Salt Lake," Utah; collected by *Watson*, no. 466; type in Herb. Gray.

From eastern Washington and Oregon to Wyoming and Colorado.

Specimens examined:

WASHINGTON: Dry rocks, Columbia River, *Suksdorf*, April–June, 1883; eastern Washington, *G. R. Vasey* 103, in 1883; near Ellensburg, Kittitas County, *G. R. Vasey*, August 1, 1889; Yakima and Spokane counties, *Henderson* 396, May–June, 1892; *Sandberg & Leiberg* 5, 180, in 1893; Pullman and Wawawai, Whitman County, *Piper* 1564, 1767, May–July, 1893; Blue Mountains, Wallawalla County, *Piper* 2339, July 15, 1896; *Sheldon* 8090, 8192, in 1897; Wawawai and Pullman, Whitman County, *Elmer* 92, 95, May, 1897.

OREGON: *Howell*, May–June, 1880; dry rocks on mountain slopes near Hood River, *Suksdorf*, May–July, 1883; *Cusick* 472, in 1884; Morrow County, *Leiberg* 36, 57, May 7–12, 1894; Malheur County, altitude 1,200 meters, *Leiberg* 2132, May 25, 1896; hills near Snake River, *Cusick* 1915, June 12, 1898.

IDAHO: Lower Clearwater River, Nez Perces County, *Sandberg* 22, April 24, 1892; Julietta, Latah County, *Henderson*, April 21, 1894; about Lewiston, Nez Perces County, *A. A. & E. Gertrude Heller* 2994, 3043, April–May, 1896; Mann's Creek (Washington County), and Cuddy Mountains, *Jones*, July 8–11, 1899.

WYOMING: La Barge, Uinta County, *Stevenson* 15, June, 1894; Evanston, Uinta County, *Nelson* 2979, May 29, 1897.

UTAH: Antelope Island, Salt Lake, altitude 2,700 meters, *Watson* 466, June, 1869; Lake Point, *Jones* 1728, May 20, 1880; Garfield, *Jones*, May 30, 1890; Dugway, *Jones*, May 26, 1891; Fairview, *Jones* 5548, June 30, 1894; Thistle, *Jones*, June 23, 1898.

COLORADO: Durango, *Alice Eastwood*, May–June 6, 1890 and 1891; Glenwood Springs, *Alida Lansing*, May, 1892; same station, *Osterhout*, June, 1895; Mancos, altitude 2,100 meters, *Baker, Earle, & Tracy* 80, June 24, 1898.

37. **Lomatium torreyi** C. & R.

Peucedanum torreyi C. & R. Bot. Gaz. **14**: 276. 1889.

Short caulescent, 7.5 to 30 cm. high, glabrous, slender, clothed at

base with old leaf sheaths; leaves small, ternate-pinnate or bipinnate, with very short (2 to 6 mm.) linear acute-tipped segments; umbel unequally few-rayed, with involucels of 1 or 2 small bractlets or none; rays 2.5 cm. long or less; pedicels 2 to 4 mm. long; flowers yellow; calyx teeth small or obsolete; fruit narrowly oblong, 8 to 12 mm. long, with wings not half as broad as body; oil tubes solitary in the intervals.

Type locality, "Yosemite Valley, California;" collected by *M. K. Curran*, June, 1883; type in Herb. Coulter.

Only known from the type locality.

Specimens examined:

CALIFORNIA: Type specimens as cited under type locality; same station, *Torrey* 165, in 1865 (in Herb. Gray).

This species was described without name in Bot. Calif. **1**: 263. 1876, as a plant closely allied to *Podosciadium*.

38. **Lomatium sandbergii** C. & R.

Peucedanum sandbergii C. & R. Bot. Gaz. **13**: 79. 1888.

Caulescent, branching at base, 2.5 cm. to 3 dm. high, from an elongated comparatively slender root, rough puberulent; petioles wholly inflated, with a very conspicuous white scarious margin; leaves ternately or pinnately dissected, the ultimate segments very short linear; umbel very unequally 6 to 15-rayed, with involucels of distinct linear-lanceolate bractlets; rays 2.5 to 10 cm. long; pedicels 2 to 4 mm. long; flowers bright yellow; fruit ovate, puberulent, 4 to 5 mm. long, 3 mm. broad, with very narrow wings, and filiform dorsal and intermediate ribs; oil tubes 4 or 5 in the intervals, 6 on the commissural side; seed face plane.

Type locality, "bare mountain tops [altitude 1,500 meters] along snowdrifts, Kootenai County, northern Idaho;" collected by *Sandberg*, no. 47, July, 1887; type in Herb. Coulter, duplicate in U. S. Nat. Herb.

Alpine in northern Idaho, adjacent Montana, and Alberta.

Specimens examined:

IDAHO: Type specimens as cited under type locality; Cœur d'Alene Mountains, altitude 1,900 meters, *Leiberg* 235, 401, July 11–28, 1895.

MONTANA: Near Columbia Falls, altitude 2,100 meters, *Williams* 969, July 12, 1894.

ALBERTA: Sheep Mountain, Waterton Lake, *Macoun* 10686, July 28–31, 1895.

39. **Lomatium microcarpum** (Howell) C. & R.

Peucedanum microcarpum Howell in C. & R. Rev. N. Am. Umbell. 65. 1888.

Closely resembling *L. sandbergii*, but differing in its stouter habit; petioles without conspicuous margins; somewhat equally-rayed umbels; deeper yellow flowers; glabrous fruit, which is oblong and 5 mm. long, and much earlier blooming.

Type locality, "on cliffs, Roseburg, Umpqua Valley, Oregon;" collected by *Howell*, no. 709, April 20, 1887; type in Herb. Coulter, duplicate in U. S. Nat. Herb.

Only known from the type locality.

Specimens examined:

OREGON: Type specimens as cited under type locality.

40. **Lomatium donnellii** C. & R.

Peucedanum donnellii C. & R. Bot. Gaz. **13**: 143. 1888.

Short caulescent or acaulescent, 1.5 to 3 dm. high, glabrous, from a fusiform root; leaves ternate then pinnately decompound, with segments pinnately cleft into short oblong or linear lobes; umbel somewhat unequally 6 to 12-rayed, with involucels of linear acuminate bractlets; rays 2.5 to 10 cm. long; pedicels 4 to 16 mm. long; flowers yellow; fruit ovate to broadly oblong, glabrous, 7 to 8 mm. long, 4 to 6 mm. broad, with wings less than half as broad as body, and prominent dorsal and intermediate ribs; oil tubes small, 4 to 6 in the intervals, 4 to 6 on the commissural side.

Type locality, "John Day Valley", Oregon; collected by *Howell*, no. 829, May 10, 1885; type in Herb. Coulter, duplicate in U. S. Nat. Herb.

Eastern Oregon and adjacent Idaho.

Specimens examined:

OREGON: Union County, *Cusick* 36, May, 1883; type specimens as cited under type locality; near Lone Rock, Gilliam County, altitude 1,240 meters, *Leiberg* 111, May 23, 1894; Otis Creek, Malheur County, altitude 1,100 meters, *Leiberg* 2329, June 19, 1896; hillsides of Agency Valley (Mathews County), and Logan Valley (Blue Mountains), *Cusick* 1622, June, 1897; *Cusick* 1857, May–June, 1898.

IDAHO: About Lewiston, Nez Perces County, altitude 750 to 900 meters, *A. A.* & *E. Gertrude Heller*, May, 1896.

41. **Lomatium lemmoni** C. & R.

Peucedanum lemmoni C. & R. Bot. Gaz. **14**: 277. 1889.

Caulescent, with most of the leaves near the base, 3 to 4 dm. high, clothed at base with old leaf sheaths, from an elongated rather slender root, glabrous; leaves broad triangular in outline, 12.5 to 20 cm. long, including petiole, twice or thrice pinnate (or so broad as to appear at first ternate); the ultimate segments linear, 2.5 to 5 cm. long; uppermost leaves much smaller and simply pinnate; umbel 6 to 8-rayed, with involucels of a few almost filiform bractlets; rays short, 6 to 14 mm. long, making the fruits appear in a head-like cluster; pedicels 2 mm. long; flowers white (?); fruit oblong, glabrous, 5 mm. long, scarcely 4 mm. broad, with thickish wings about half as broad as body, and distinct dorsal and intermediate ribs; oil tubes solitary in the dorsal intervals, 2 or 3 in the lateral, 4 to 6 on the commissural side; seed face plane.

Type locality, "Huachuca Mountains," southeast Arizona; collected by *Lemmon*, no. 392, June, 1887; type in U. S. Nat. Herb.

Only known from the type locality.

Specimens examined:

ARIZONA: Type specimens as cited under type locality.

42. **Lomatium congdoni** C. & R., sp. nov.

Acaulescent, glabrous; peduncles ascending, 1.5 to 2 dm. long, terete, purplish; leaves first quinate, the middle division elongated, then twice to thrice pinnate; the ultimate segments short, linear, acute, mostly entire, glabrous above, slightly scabrous beneath; sheath narrow and slender, extending the full length of the petiole; umbels with 6 to 8 fertile rays, and no involucels; rays 2 to 5 cm. long; pedicels spreading, 6 to 8 mm. long; fruit nearly elliptical, slightly broader above, 8 mm. long, 5 mm. broad, with wings slightly narrower than body, and filiform dorsal and intermediate ribs; oil tubes very indistinct, one or perhaps more in the intervals.

Type locality, West Water Ditch, Mariposa County, Cal.; collected by *J. W. Congdon*, no. 114, May 12 and 25, 1893; type in U. S. Nat. Herb.

Mariposa County, Cal.

Specimens examined:

CALIFORNIA: Mariposa, Mariposa County, *Congdon*, May 24, 1892; type specimen as cited under type locality.

43. **Lomatium plummerae** C. & R.

Peucedanum plummerae C. & R. Bot. Gaz. **14**: 278. 1889.

Short caulescent, with a cluster of stout widely spreading peduncles (2 to 3 dm. high) rising much above the leaves and from a thick tuberous root, glabrous and somewhat glaucous; leaves ternately decompound, the numerous crowded ultimate segments very small, oblong, more or less confluent; umbel very unequally 6 to 12-rayed, with involucels of numerous lanceolate acuminate bractlets; rays 1 to 7.5 cm. long; pedicels 4 to 8 mm. long; flowers white; fruit oblong, but usually acute at apex, glabrous, 8 to 9 mm. long, 4 to 5 mm. broad, with wings from half to as broad as body, and indistinct dorsal and intermediate ribs; oil tubes 2 or 3 in the intervals, 4 to 6 on the commissural side.

Type locality, "Sierra Valley, Sierra County," Cal.; collected by *Lemmon*, no. 32, May, 1889; type in U. S. Nat. Herb. Associated with the type in the original description is *Lemmon* 40 from near Shasta, Shasta County, June 28, 1889.

Northeastern California.

Specimens examined:

CALIFORNIA: Type specimens as cited under type locality.

44. **Lomatium brevifolium** C. & R.

Peucedanum triternatum brevifolium C. & R. Rev. N. Am. Umbell. 70. 1888.

Rather stout and rough puberulent, resembling *L. triternatum*, but with smaller more compact leaves with stout inflated petioles and usually shorter broader and often toothed segments; umbels very unequally 5 to 15-rayed, with involucels of lanceolate or setaceous

bractlets; rays 2.5 to 8.5 cm. long; pedicels 4 to 8 mm. long; flowers yellow, with puberulent ovaries becoming more or less glabrate in fruit; fruit narrowly oblong, 10 to 16 mm. long, 4 to 5 mm. broad, with wings half as broad as body or less; oil tubes solitary in the intervals.

Type locality, "Oregon, Klickitat County;" collected by *Howell*, no. 379, June 1, 1881; type in Herb. Coulter.

Oregon and Washington.

Specimens examined:

OREGON: Type specimens as cited under type locality; near Beulah, Malheur County, altitude 1,080 meters, *Leiberg* 2304, June 17, 1896; *Leiberg* 4312, in 1899.

WASHINGTON: Klickitat River, *Suksdorf* 1202, June 26, 1885; near Columbus, Klickitat County, *Suksdorf* 1203, June 10, 1886; Yelm Prairie, Thurston County, *Smith* 568, August, 1889; *G. R. Vasey*, in 1889; Klickitat hills, *Howell* 1368, April 26, 1891; *Sandberg & Leiberg* 596, in 1893.

45. **Lomatium macdougali** C. & R., sp. nov.

Resembling *L. foeniculaceum*, but lower, more inclined to branch at base, and persistently hirsute; leaves smaller, with more crowded segments; involucels of less conspicuous linear bractlets either distinct or somewhat united, hirsute; rays 1 to 5 cm. long; pedicels 8 to 10 mm. long; flowers purple to yellow; fruit elliptical, somewhat pubescent, 6 to 7 mm. long, 4 mm. broad, with wings less than half as broad as body; oil tubes several in the intervals.

Type locality, Mormon Lake, Arizona, altitude 1,800 meters; collected by *MacDougal*, no. 84, June 11, 1898; type in U. S. Nat. Herb.

Arizona, Utah, and Nevada.

Specimens examined:

ARIZONA: Mohave County, *Newberry*, March 29, 1858; *Mrs. Thompson* 98, in 1872; Ash Fork, *Rusby* 3164, May 12, 1883; northern Arizona, *Lemmon;* Walnut Canyon and Flagstaff, *MacDougal* 84, May–June, 1891; type specimens as cited under type locality.

UTAH: *Capt. Bishop* 30, in 1872.

NEVADA: Battle Mountains, altitude 2,100 meters, *Watson* 470, June, 1868 (distributed as *Peucedanum (?) villosum* Nutt.); Mount Magruder, Esmeralda County, *V. Bailey* 2008, June 5, 1891; Palmetto Range, altitude 2,700 to 3,000 meters, *Purpus* 5867, in 1898.

This species approaches *L. mohavense* of the Mohave Desert, California, but may be distinguished by its softer pubescence, purple to yellow flowers, and smaller fruit.

46. **Lomatium jonesii** C. & R., sp. nov.

Resembling *L. foeniculaceum*, but lower, more inclined to branch at base, at least the foliage persistently villous; leaves smaller, with more crowded segments; involucels of less conspicuous linear usually distinct and villous bractlets; rays 1 to 3 cm. long; pedicels 3 to 12 mm. long; flowers yellow or tinged with purple; fruit elliptical or broadly oblong, pubescent, 8 mm. long, 6 to 7 mm. broad, with broader wings (more than half as broad as body).

Type locality, Irelands Ranch, head of Salina Canyon, Utah, altitude 2,400 meters; collected by *Jones*, no. 5435, June 15, 1894; type in U. S. Nat. Herb.

From Utah through Idaho, western Wyoming, and western Montana to Northwest Territory.

Specimens examined:

UTAH: Dog Valley and Frisco, altitude 1,500 meters, *Jones* 1689, April 28, 1880; Salina Canyon (altitude 1,560 meters) and Emery (altitude 2,100 meters) *Jones* 5422, 5445, June 14–16, 1894; type specimens as cited under type locality.

IDAHO: *Ainslie;* near Pocatello, *Palmer* 12, May 20, 1893; *Barton*, in 1895.

WYOMING: Fort Steele, *Nelson* 4835, June 18, 1898.

MONTANA: Belt River, *Williams* 150, April 24, 1881; Jefferson County, *Tweedy*, June, 1888.

NORTHWEST TERRITORY: Along Maple Creek, *Macoun*, May, 1884.

47. **Lomatium mohavense** C. & R.

Peucedanum mohavense C. & R. Rev. N. Am. Umbell. 62. 1888.

Resembling *L. tomentosum* in habit, but with much more strigose pubescent leaves, which are dissected into very small much crowded linear-oblong or obovate obtuse segments; umbel somewhat unequally 6 to 10-rayed, with involucels of linear to lanceolate acuminate bractlets; fertile rays 2.5 to 5 cm. long; pedicels 4 to 8 mm. long; flowers probably white; calyx teeth obsolete; fruit broadly elliptical to almost orbicular, with close fine pubescence, 8 to 10 mm. long, 6 to 8 mm. broad, with wings not as broad as body, and prominent and approximate dorsal and intermediate ribs; oil tubes 3 or 4 in the intervals, 8 to 10 on the commissural side.

Type locality, "Yucca, Mohave Desert, California;" collected by *M. K. Curran*, June, 1884; type in Herb. Coulter, fragments in U. S. Nat. Herb.

Southeastern California.

Specimens examined:

CALIFORNIA: Type specimens as cited under type locality; also probably the following plants: Morongo Pass, San Diego County, *Parish* 597 B, April, 1882; Hesperia, Mohave Desert, *Parish* 3608, June 14, 1895.

Parish 3608 has smaller fruit than the type, but otherwise seems to represent the species. *L. macdougali* of Arizona approaches this species most nearly, but *L. mohavense* has much harsher pubescence throughout (that of the fruit being much stronger and harsher), white flowers, and usually larger fruit.

48. **Lomatium argense** (Jones) C. & R.

Peucedanum argense Jones, Contr. Western Botany no. 8: 30. 1898.

Acaulescent, with stout peduncles 1 to 3 dm. high and somewhat exceeding the leaves, the whole plant hoary with short pubescence; leaves pinnately decompound (or the primary division appearing ternate); the ultimate segments very small and thick, oblong to obovate, apiculate; umbel nearly equally 10 to 15-rayed, with involucels of linear

to lanceolate-subulate bractlets; rays stout, 2.5 to 3.5 cm. long; pedicels about 2 mm. long; flowers "white, yellow, or purple;" fruit from broadly ovate to orbicular, pubescent, 5 to 7 mm. long, with wings half to as broad as body, and distinct filiform dorsal and intermediate ribs; oil tubes 3 in the intervals, 4 on the commissural side; seed face plane.

Type locality, among rocks, "Lone Pine, Inyo County, Cal.," altitude 2,100 meters; collected by *Jones*, May 14, 1897; type in Herb. Jones.

Inyo County, Cal.

Specimens examined:

CALIFORNIA: Walker Pass (altitude 900 to 1,200 meters), and Argus Mountain (altitude 1,200 to 1,500 meters), *Purpus* 5352, 5479, in 1897.

Fruit a little smaller than in *L. mohavense*, but otherwise too near it.

49. **Lomatium parishii** C. & R.

Peucedanum parishii C. & R. Bot. Gaz. **13**: 209. 1888.

Caulescent or acaulescent, 1 to 3 dm. high, glaucous, closely pubescent, from a thick elongated root; leaves pinnate, with pinnatifid to entire leaflets, the ultimate oblong-linear or linear segments cuspidate, somewhat toothed or entire; basal leaves sometimes nearly entire or few-cleft; umbel unequally 4 to 12-rayed, with involucels of small linear-lanceolate acuminate bractlets; rays 2.5 to 12.5 cm. long; pedicels 4 to 8 mm. long; flowers white; fruit somewhat obovate, glabrous, 7 to 12 mm. long, 4 to 8 mm. broad, with the usually narrow wings in robust specimens sometimes becoming almost as broad as body, and filiform or obsolete dorsal and intermediate ribs; oil tubes exceedingly small, often obscure, 6 to 8 in the intervals, 8 to 10 on the commissural side; seed face concave.

Type locality, rocky hillsides, "Bear Valley," San Bernardino County, Cal., altitude 1,800 meters; collected by *S. B. Parish*, no. 1828, June, 1886; type in Herb. Coulter, duplicate in U. S. Nat. Herb.

Southern California and adjacent Nevada.

Specimens examined:

CALIFORNIA: *Lemmon*, in 1875; type specimens as cited under type locality; high ridges on Old Baldy Mountain, San Bernardino County, *Parish* 1942, June, 1887; Panamint Mountains (Inyo County), altitude 1,950 to 2,330 meters, *Coville & Funston* 541, 745, April–May, 1891; ridges, San Bernardino Mountains, Los Angeles County, altitude 810 meters, *Hasse*, May 21, 1893; type locality, *Parish* 3366, June, 1894 and 1895; foothills, Antelope Valley, Los Angeles County, altitude 900 meters, *Davidson*, May 6, 1895.

NEVADA: Mica Springs, southern Nevada, altitude 1,200 meters, *Jones* 5064, 5072, April 14–16, 1894.

50. **Lomatium juniperinum** (Jones) C. & R.

Peucedanum juniperinum Jones, Contr. to Western Botany no. 8: 29. 1898.

Caulescent, ashy-puberulent, about 3 dm. high, from a tuberous root, with one or few slender purplish stems; leaves about 7.5 cm.

long, ternate to biternate then bipinnate; ultimate segments linear to lanceolate, acute, 2 to 4 mm. long; sheaths enlarged; umbel with about 20 unequal rays (about 6 fertile), rarely a simple or leaf-like involucral bract, and involucels of several filiform subulate bractlets; fertile rays 2.5 to 5 cm. long; fertile pedicels 6 to 10 mm. long; flowers yellow; fruit elliptical, 6 to 8 mm. long, 4 mm. wide, with wings a little narrower than body, and evident dorsal and intermediate ribs; oil tubes 2 in the dorsal intervals, 3 in the lateral, a small one on the inner edge of the wing, and 4 on the commissural side; seed face plane.

Type locality, "at Coalville, Utah, among junipers;" collected by *Jones*, May 14, 1889; type in Herb. Jones, fragment and photograph in U. S. Nat. Herb. Associated with the type is Jones's specimen, from Carter, southwest Wyoming, June 25, 1896.

Utah and adjacent Wyoming.

Specimens examined:

UTAH: Type specimens as cited under type locality.

51. **Lomatium austinae** C. & R.

Peucedanum austinae C. & R. Bot. Gaz. **13**: 208. 1888.

Resembling *L. hallii*, but pubescent (?), with leaf segments larger and pinnate, with narrow often toothed divisions; flowers purplish; fruit 7 mm. long, 3 mm. broad; oil tubes solitary in the dorsal intervals, mostly 2 in the lateral, 4 on the commissural side, and an additional one in each group of strengthening cells; seed face concave, with central longitudinal ridge.

Type locality, Big Meadows, "Plumas County," Cal.; collected by *Mrs. R. M. Austin*, June, 1880; type in Herb. Coulter.

In the mountains of northeastern California, from Sierra County to Siskiyou County.

Specimens examined:

CALIFORNIA: Type specimens as cited under type locality; Sierra County, *Lemmon:* Yreka, Siskiyou County, *Greene* 732.

52. **Lomatium sonnei** C. & R., sp. nov.

Short caulescent, 2 to 3 dm. high, from a slender elongated root, puberulent; leaves ternate then pinnately compound, the ultimate segments short linear; umbels unequally 5 to 8-rayed, with involucels of linear scarious-margined bractlets united at base; rays 2 to 4 cm. long; pedicels 4 to 6 mm. long; flowers yellow; fruit elliptical, glabrous, 8 mm. long, 4 mm. broad, with wings nearly as broad as body, and filiform dorsal and intermediate ribs; oil tubes large and solitary in the intervals.

Type locality, sandy soil among sagebrush, Verdi, Washoe County, Nev.; collected by *Sonne*, May 5 and June 16, 1895; type in U. S. Nat. Herb.

Washoe County, Nev., and Nevada County, Cal.

Specimens examined:

NEVADA: Type specimens as cited under type locality.

CALIFORNIA: Near Truckee, Nevada County, *Sonne*, May 23, 1886.

53. **Lomatium bicolor** (Watson) C. & R.

Peucedanum bicolor Watson, Bot. King Surv. 129. 1871.

Caulescent or scarcely so, 1 to 4.5 dm. high, glabrous or slightly puberulent; petioles wholly dilated; leaves ternate then pinnately decompound, the ultimate segments very numerous and filiform; umbel very unequally 2 to 10-rayed, with involucels of 1 to 8 linear-subulate bractlets; rays 2.5 to 12.5 cm. long; pedicels short; flowers yellow; fruit linear-oblong, glabrous, 10 to 12 mm. long, 2 to 5 mm. broad, with very narrow wings and nearly obsolete dorsal and intermediate ribs; oil tubes large and solitary in the intervals, 2 on the commissural side.

Type locality, Parleys Park, "Wasatch Mountains, Utah," altitude 1,500 to 1,950 meters; collected by *Watson*, no. 467, May–June, 1869; type in U. S. Nat. Herb.

Utah and Idaho, and adjacent Wyoming.

Specimens examined:

UTAH: Type specimens as cited under type locality; City Creek Canyon, altitude 1,920 meters, *Jones* 1713, May 15, 1880; same station, *Jones*, June 6, 1898.

IDAHO: Kootenai County, *Leiberg* 474, May, 1890; Weisners Peak, Kootenai County, *Sandberg* 596, July 8, 1892; Coeur d'Alene River, Kootenai County, *Leiberg* 631, May–July, 1892.

WYOMING: La Barge, Uinta County, *Stevenson*, July 21, 1894.

Mr. M. E. Jones writes as follows in reference to this species: "This plant, which is sporadic in its type locality in Utah, here reaches its full development on the gumbo soil of Idaho. There are acres of it."

54. **Lomatium anomalum** Jones, sp. nov.

Caulescent, glabrous, or somewhat puberulent, rather stout, 3 to 4.5 dm. high, tufted from a large root; stem leaves 2, large, with wholly dilated petioles, ternate and then once or twice pinnate; ultimate segments linear-lanceolate to oblanceolate, acute, often lobed, 1 to 7.5 cm. long, 2 to 16 mm. broad; fertile umbels unequally 5 to 15-rayed, with involucels of linear or setaceous bractlets; rays 5 to 15 cm. long; pedicels 3 to 6 mm. long; flowers yellow, with glabrous ovaries; fruit from elliptical and 6 mm. long to narrowly oblong and 12 mm. long, 4 to 5 mm. broad, with wings not half to nearly as broad as body, and prominent more or less winged dorsal and intermediate ribs; oil tubes very large, solitary in the intervals, 4 on the commissural side.

Type locality, rocky gumbo soil, slopes of Indian Valley, Washington County, Idaho, altitude 1,200 meters; collected by *Jones*, July 15, 1899; type in Herb. Jones, duplicate in U. S. Nat. Herb.

Idaho and adjacent Oregon.

Specimens examined:

IDAHO: Type specimens as cited under type locality; along Hatwai Creek, Nez Perces County, *Sandberg* 28, April 24, 1892; Camas Prairie, *Henderson* 2660, June 24, 1894; forks of St. Marys River, Coeur d'Alene Mountains, altitude 1,000 meters, *Leiberg* 128, July 1, 1895; about Lewiston, Nez Perces County, *A. A. & E. Gertrude Heller* 3132, May 27, 1896.

OREGON: Hills near Snake River, *Cusick* 1905, May 31, 1898.

55. **Lomatium platyphyllum** C. & R.

Peucedanum latifolium Nutt. in Torr. & Gray, Fl. **1**: 625. 1840. Not DC.
Peucedanum nuttallii Watson, Bot. King Surv. 128. 1871, not *Seseli nuttallii* Gray (1870).

Resembling *L. nudicaule*, but smaller; leaves once or twice ternate, with ovate to orbicular leaflets cuneate to cordate at base; pedicels usually of the longer type; fruit ovate to oblong, 8 mm. long, 6 mm. broad, and very narrowly winged; oil tubes small, 3 in the intervals, 4 to 6 on the commissural side; seed face almost plane.

Type locality, "plains east of Wallawalla River, Oregon;" collected by *Nuttall;* type in Herb. Philad. Acad.

From northern Nevada to eastern Washington and adjacent Idaho.

Specimens examined:

NEVADA: Havallah Mountains, *Watson* 462, June, 1868; Aurum, White Pine County, altitude 2,190 meters, *Jones*, June 30, 1893.

OREGON: Type specimens as cited under type locality; "sterile stony ridges," *Cusick*, in 1884; near Rock Creek, Morrow County (altitude 790 meters), and near Grizzly Butte, Crook County (altitude 1,090 meters), *Leiberg* 82, 289, May–June, 1894.

WASHINGTON: Upper Columbia (no. 1090) and Spokane rivers, *Wilkes Exped.; Sandberg & Leiberg* 487, in 1893; *Whited*, April 12, 1896; Wenatchee Mountains, Kittitas County, altitude 1,200 meters, *Elmer* 475, July, 1897.

56. **Lomatium nudicaule** (Pursh) C. & R.

Smyrnium nudicaule Pursh, Fl. **1**: 196. 1814.
Ferula nudicaulis Nutt. Gen. **1**: 183. 1818.
Ferula nuttallii DC. Prodr. **4**: 174. 1830.
Seseli leiocarpum Hook. Fl. Bor. Am. **1**: 263. pl. 93. 1834.
Peucedanum leiocarpum Nutt. in Torr. & Gray, Fl. **1**: 626. 1840.
Peucedanum nudicaule Nutt. in Torr. & Gray, Fl. **1**: 627. 1840.
Peucedanum robustum Jepson, Erythea **1**: 9. 1893.

Acaulescent, glabrous, 3 to 6 dm. high, from a very long fleshy root; leaves biternate or ternate-quinate or sometimes simply ternate; leaflets thickish, from ovate to narrowly lanceolate, 2.5 to 5 cm. long, petiolulate or sessile, entire or toothed at apex; umbel very unequally 5 to 20-rayed, with neither involucre nor involucels; peduncles and rays dilated at summit; rays 2.5 to 20 cm. long; pedicels variable, 2 to 20 mm. long; flowers yellow; fruit narrowly oblong, 9 to 14 mm. long, 3 to 6 mm. broad, narrowly winged; oil tubes large and solitary in the intervals or 2 in the laterals, 4 or 6 on the commissural side; seed face somewhat concave.

Type locality, "on the Columbia River;" collected by *Lewis* (accord-

ing to Dr. Coues, the exact date and locality for the type specimens are "April 15, 1806; Rock Fort Camp, at the Dalles of the Columbia"); type in Herb. Philad. Acad. The type locality of Hooker's *Seseli leiocarpum* is "on gravelly soils, near Fort Vancouver on the Columbia," Washington; collected by *Douglas*.

From central California to British Columbia and Idaho.

Specimens examined:

CALIFORNIA: Upper Sacramento Valley, *Parkinson;* Elk Ridge, Mendocino County, *Bolander* 6521, in 1867; Sierra Nevada Mountains, *Lemmon*, in 1875; Plumas County, *Mrs. R. M. Austin*, in 1880; Mount Shasta, Siskiyou County, *Palmer* 2533, July 13–27, 1892; Amador County, *Hansen* 332, June 17, 1894; Goose Lake Valley, Modoc County, *Mrs. R. M. Austin*, May, 1894; Mount Hamilton, *Rutter* 55, April 11, 1895.

OREGON: *Lt. Mullen's Exped.; Howell*, May–July, 1880; Malheur County, altitude 1,220 meters, *Leiberg* 2137, May 26, 1896; Klamath County, *Applegate* 233, June 28, 1896.

WASHINGTON: Puget Sound, *Wilkes' Exped.* 51; Klickitat County, *Suksdorf*, May–July, 1883; Ellensburg, Spokane County, *G. R. Vasey* 295, 297, May, 1889; Seattle, *Smith & Piper* 569, June 20, 1889; Clealum, Kittitas County, *Henderson*, June–July, 1892.

IDAHO: Big Camas Prairie, altitude 1,500 meters, *Henderson* 3178, July 14, 1895.

BRITISH COLUMBIA: Cedar Hill, Vancouver Island, *Macoun*, July, 1887.

This species is very variable in breadth of leaves, stalking of leaflets, length of pedicels, and size of fruit, but these variable characters do not work together or with geographical distribution in suggesting possible segregates.

Smyrnium nudicaule Pursh has been identified by Messrs. Robinson and Greenman (Proc. Philad. Acad. 28. 1898), who examined the type in the herbarium of the Philadelphia Academy, to be the same as *Seseli leiocarpum* Hook., which accords far better with the rather puzzling type locality of the former when the name was applied to plants of the eastern plains.

57. **Lomatium suksdorfii** (Watson) C. & R.

Peucedanum suksdorfii Watson, Proc. Am. Acad. **20**: 369. 1885.

Very stout and tall, glabrous or somewhat puberulent, 6 to 9 dm. high or more, from a very large root; leaves very large and decompound; leaf segments linear-oblong, 1 to 5 cm. long, entire or 2 to 3-cleft toward the top; umbel somewhat equally 6 to 12-rayed, with involucels of linear acuminate bractlets; rays 2.5 to 12.5 cm. long; pedicels 6 to 18 mm. long; flowers yellow; fruit narrowly oblong, 18 to 28 mm. long, 6 to 12 mm. broad, with wings narrower than body, and very prominent dorsal and intermediate ribs; oil tubes solitary, very large (filling the invervals), 2 on the commissural side; seed face somewhat concave.

Type locality, "on dry rocky mountain sides, W. Klickitat County, Washington Territory;" collected by *Suksdorf*, June–July, 1883; type in Herb. Gray, duplicate in U. S. Nat. Herb.

Eastern Washington.

Specimens examined:

WASHINGTON: Type specimens as cited under type locality; *G. R. Vasey* 300, in 1889; *Sandberg & Leiberg* 489, in 1893.

58. **Lomatium giganteum** C. & R., sp. nov.

Caulescent or sometimes acaulescent, 4 to 7 dm. high, finely pubescent throughout; leaves very large, ternately compound; leaflets elongated, sometimes reaching 8 cm. in length, usually entire, very pale; rays very unequal, the longer ones 10 cm. long; pedicels 2 to 4 mm. long; involucel of linear bractlets; ovary pubescent; fruit linear oblong, 18 mm. long, with wings much narrower than body, glabrous or nearly so.

Resembling *L. suksdorfii* in its stout habit, but with more elongated leaflets, pubescent ovaries, smaller fruit, etc.

Type locality, California; collected by *G. R. Vasey* in 1875; type in U. S. Nat. Herb.

Western California.

Specimens examined:

CALIFORNIA: Mendocino County, *Bolander* 5521, in 1867; probably same station, *Vasey*, in 1875.

"*Peucedanum* (*Ferula*, Gey.) *tenuissimum* Gey. MS." (in Hook. Lond. Journ. Bot. **6**: 235. 1847) is still doubtful. It is probably a good species, but more than likely has been described under some other name.

Peucedanum triternatum leptophyllum Hooker l. c. is also uncertain.

Both of these types are probably in the British Museum. Material which seems to represent these two forms was sent to Mr. E. G. Baker for comparison, and it is to be regretted that his report, now in transit, can not be incorporated in this work.

Peucedanum jaredi Eastwood (Zoe **5**: 88. 1900) is a new name which has come to us during the final proof revision.

59. EURYPTERA Nutt. in Torrey & Gray, Fl. **1**: 629. 1840.

Calyx teeth minute or obsolete. Fruit strongly flattened dorsally, orbicular to shortly oblong. Carpel with filiform and approximate dorsal and intermediate ribs, and with broadly winged laterals (often much broader than the seed body and more or less distinct at base, making it cordate or emarginate) cohering until maturity with those of the other carpel; pericarp thin. Stylopodium wanting; disk impressed. Oil tubes one to several in the intervals. Seed strongly dorsally flattened, with plane face.

Acaulescent or caulescent glabrous perennials, with elongated roots, branching only at base, leaves once or twice compound, leaflets either broad or broad in outline and always sharply toothed, and yellow flowers.

Type species, *Euryptera lucida* Nutt.

A genus of 6 species belonging to the Pacific coast and islands.

The genus differs from typical *Lomatium* especially in its foliage, which is much more simple, with broad often orbicular leaflets, and sharp mucronate teeth. The wings of the fruit are inclined to be distinct, while in *Lomatium* the wings are united and project below the seed. Nuttall's genus *Euryptera*, based on a single species, was published by Torrey & Gray in 1840, but was reduced to a section of *Peucedanum* by Bentham & Hooker in *Genera Plantarum* in 1867, where it has since remained.

As we now understand the group, it is composed of 6 species possessing certain characters in common which enable them to be distinguished readily from the nearest related genus.

Oil tubes solitary in the intervals.
  More or less caulescent.
    Leaflets broadly cordate and somewhat lobed..... 1. *E. lucida.*
    Leaflets not cordate.
      Leaves bipinnate..... 2. *E. parvifolia.*
      Leaves biternate..... 3. *E. hassei.*
  Acaulescent and very pale..... 4. *E. pallida.*
Oil tubes not solitary in the intervals.
  Peduncles 3 to 4.5 cm. high; fruit 5 to 8 mm. long..... 5. *E. howellii.*
  Peduncles 15 cm. high; fruit 12 mm. long..... 6. *E. insularis.*

1. **Euryptera lucida** Nutt. in Torr. & Gray, Fl. **1**: 629. 1840.

FIG. 61.

Peucedanum eurypteru Gray, Proc. Am. Acad. **7**: 348. 1868.

Short caulescent, glabrous, rather stout, 1.5 to 6 dm. high; leaves ternate; leaflets broadly cordate, somewhat lobed, coarsely mucronate-toothed, 1 to 2.5 cm. long; umbel equally 8 to 15-rayed, with involucels of lanceolate bractlets; rays 1 to 5 cm. long; pedicels 12 mm. long; flowers yellow; fruit nearly orbicular, emarginate at each end, glabrous, 10 to 14 mm. in diameter, with wings more than twice as broad as body, and prominent obtuse dorsal and intermediate ribs; oil tubes solitary in the intervals, 2 to 4 on the commissural side.

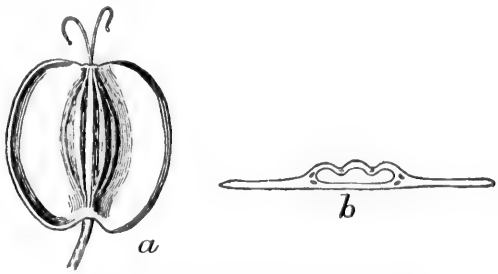


FIG. 61.—Euryptera lucida: *a*, ×2; *b*, ×3.

Type locality, "woods of San Diego, California;" collected by *Nuttall* in April; type in Herb. Philad. Acad.

Southern California, in San Diego, Los Angeles, and San Bernardino counties.

ILLUST. Bot. Mex. Bound. Rep. pl. 27.

Specimens examined:

CALIFORNIA: Type specimens as cited under type locality; Fort Mohave and San Diego, *Cooper* 411, in 1860–61; San Diego, *Orcutt*, March 12, 1884; same station, *Cleveland*, in 1890; Sierra Madre, Los Angeles County, *Hasse*, April 4, 1890; plains west of San Bernardino, *Parish* 2132, April 4, 1891; Waterman Canyon, San Bernardino Mountains, *Parish* 3478, June 29, 1894.

2. **Euryptera parvifolia** (Hook & Arn.) C. & R.

Ferula parvifolia Hook. & Arn. Bot. Beechey 348. 1840.

Peucedanum parvifolium Torr. & Gray, Fl. **1**: 628. 1840.

Peucedanum californicum C. & R. Bot. Gaz. **13**: 143. 1888

Short caulescent, slender, with a solitary peduncle 1 to 3 dm. high, leaves clustered near the base, usually large (1 to 1.5 dm. long), bipinnate (but the upper leaflets confluent); leaflets broad, obtuse (usually ending truncately or emarginately between two divaricate teeth), irregularly incised and with broad strongly cuspidate teeth; umbel 8 to 10-rayed, with involucels of linear or lanceolate acuminate bractlets; rays 1 to 3.5 cm. long; pedicels 6 to 8 mm. long; flowers yellow; fruit broadly elliptical to orbicular, 6 to 7 mm. long, scarcely emarginate, with wings broader than body, and rather prominent dorsal and intermediate ribs; oil tubes solitary in the intervals, 2 to 4 on the commissural side.

Type locality, in California, but station not given; collected by *Douglas*.

San Luis Obispo County, Cal.

Specimens examined:

CALIFORNIA: San Luis Obispo, *Jones* 3226, May 5, 1882; same station, *Mrs. R. W. Summers*, in 1889; San Simeon, *Brandegee*, June, 1889.

3. **Euryptera hassei** C. & R.

Peucedanum hassei C. & R. Bot. Gaz. **14**: 276. 1889.

Tall caulescent, stout, 6 dm. or more high, glabrous and somewhat glaucous, from a long slender woody root; leaves biternate, on very long petioles (sometimes 2.5 cm. including petiole); leaflets broadly ovate, with cuneate base, irregularly lobed, coarsely mucronate-toothed, 2.5 to 10 cm. long, becoming 6 cm. broad; umbel long-peduncled, equally 8 to 18-rayed, with involucels of bractlets which vary from rather short linear-setaceous to oblanceolate, foliaceous, entire or toothed and much exceeding the pedicels; rays 5 to 10 cm. long; pedicels 12 to 16 mm. long; flowers yellow; fruit as in *E. lucida*.

Type locality, canyon of Sierra Madre, "Los Angeles County, California;" collected by *Hasse*, March 27 and April 7, 1888; type in U. S. Nat. Herb., duplicate in Herb. Coulter.

Only known from type locality, excepting the specimen from Vaca Mountains, reported below by Jepson.

Specimens examined:

CALIFORNIA: Type specimens as cited under type locality; summit of the Vaca Mountains, *Jepson*, June 20, 1892 (*fide* Jepson).

4. **Euryptera pallida** C. & R., sp. nov.

Acaulescent, glabrous throughout and very pale; peduncles about 2 dm. high, exceeding the leaves; leaves pinnate (or first division appearing ternate), lowest pair of pinnae often pinnate; leaflets broad, with rhomboidal or irregularly angled outline, the very broad teeth mucronate tipped; fruiting umbel about 6-rayed, with involucels of few linear-lanceolate bractlets; rays 2.5 to 4 cm. long; pedicels 8 to 10 mm. long; fruit oblong, 10 mm. long, 6 to 7 mm. broad, emarginate at base, with wings as broad as body; oil tubes solitary.

Type locality, Santa Lucia Mountains, California; collected by *G. R. Vasey*, no. 232, July, 1880; type in U. S. Nat. Herb.

Only known from type locality.

Specimens examined:

CALIFORNIA: Type specimens as cited under type locality.

5. **Euryptera howellii** (Watson) C. & R. FIG. 62.

Peucedanum howellii Watson, Proc. Am. Acad. **20**: 369. 1885.

Acaulescent, with peduncle 3 to 4.5 cm. high; leaves biternate to biquinate; leaflets cuneate-orbicular to round-cordate, acutely dentate, often 3-lobed, 1 to 2.5 cm. long; umbel with few elongated and divaricate fertile rays, and involucels of acuminate lanceolate bractlets; rays

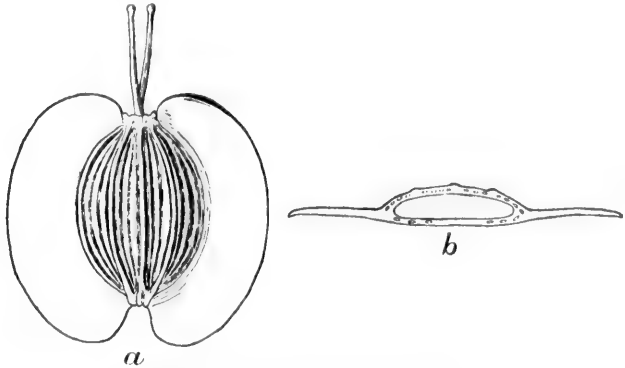


FIG. 62.—Euryptera howellii: *a*, × 6; *b*, × 8.

3 to 8.5 cm. long; pedicels 8 to 12 mm. long; fruit glabrous, broadly elliptical or nearly orbicular, emarginate, 5 to 8 mm. long, with wings about as broad as body or broader; oil tubes 3 or 4 in the intervals, 4 to 10 on the commissural side.

Type locality, "near Waldo, Josephine County, Oregon;" collected by *Howell*, June 6, 1884; type in Herb. Gray, duplicate in U. S. Nat. Herb.

Josephine County, Oregon.

Specimens examined:

OREGON: Type specimens as cited under type locality; same station, *Howell*, July 7, 1887.

6. **Euryptera insularis** (Eastwood) C. & R.

Peucedanum insulare Eastwood, Proc. Calif. Acad. Sci. III. **1**: 106. pl. 8. 1898.

Acaulescent from a long rather stout root; peduncles stout, dilated at summit, 1.5 dm. high; leaves biternate to biquinate; leaflets cuneate, sharply dentate or incised, veiny; fruiting umbel 10 to 18-rayed, with involucre of a single elongated bract palmately divided at apex, and involucels of several linear bractlets; rays 3 to 8 cm. long; pedicels about 10 mm. long; flowers yellow; fruit elliptical, glabrous, 12 mm.

long, 8 mm. broad, emarginate at base and apex, with wings as broad as body or broader, and inconspicuous dorsal and intermediate ribs; oil tubes usually 2 in the intervals, 6 on the commissural side.

Type locality, "sand cliffs overhanging briny arroyas," San Nicholas Island, California; collected by *Blanche Trask*, April, 1897; type in Herb. Calif. Acad., duplicate in U. S. Nat. Herb.

San Nicholas Island, California.

Specimens examined:

CALIFORNIA: Type specimens as cited under type locality.

60. CYNOMARATHRUM Nutt. in Herb.

Calyx teeth evident. Fruit strongly flattened dorsally, oblong. Carpel with sharp or winged dorsal and intermediate ribs and broader

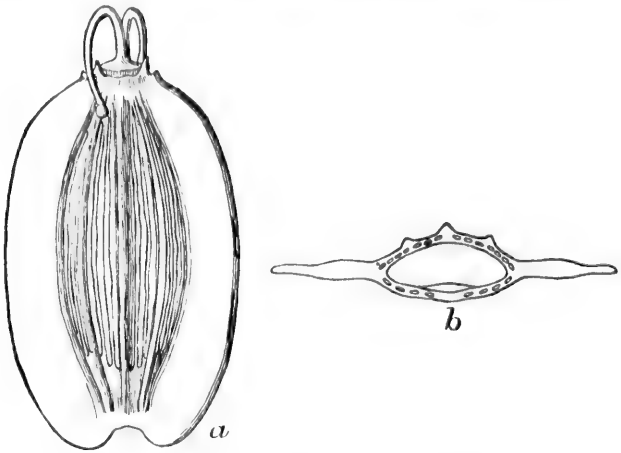


FIG. 63.—Cynomarathrum eastwoodae: *a*, ×6; *b*, ×8.

winged laterals. Stylopodium flat but evident, in dry specimens appearing spongy. Oil tubes mostly several in the intervals or obscure. Seed dorsally flattened, with plane face.

Acaulescent plants or nearly so, from a stout caudex becoming multicipital and densely clothed with old leaf sheaths, with leaves narrow in outline (the first division pinnate), and yellow (or white?) flowers.

Type species, *Seseli nuttallii* Gray, Proc. Am. Acad. **8**: 287. 1870.

A genus of 6 species belonging to the western plains and mountains.

It seems best to keep out of *Lomatium* the six following species, which have heretofore been placed under *Peucedanum*. They have always appeared anomalous in *Peucedanum* (*Lomatium*), and some of our best botanists have treated the earlier species as very distinct. One of them was considered a generic type by Nuttall, under the name which we have adopted above. Dr. Gray associated it with *Seseli*, while some of the recent collectors have contended that it was not congeneric with our so-called western species of *Peucedanum*. It differs from *Lomatium*

in stylopodium-disk, calyx teeth, more winged dorsal and intermediate ribs, and in its very peculiar habit. Its relationships seem to be much nearer *Pteryxia* and *Pseudocymopterus*.

Foliage glabrous.
  Rays and pedicels not very short or reflexed.
    Pedicels 2 to 6 mm. long ..... 1. *C. nuttallii*.
    Pedicels 8 to 16 mm. long.
      Fruit linear-oblong, 4 to 7 mm. long ..... 2. *C. alpinum*.
      Fruit broader, 10 to 12 mm. long ..... 3. *C. parryi*.
  Rays and pedicels very short, reflexed at maturity ..... 4. *C. brandegei*.
Foliage very scabrous.
  Pedicels 12 to 18 mm. long; wings about as broad as body ..... 5. *C. eastwoodae*.
  Pedicels 2 to 6 mm. long; wings half as broad as body ..... 6. *C. scabrum*.

1. **Cynomarathrum nuttallii** (Gray) C. & R.

Seseli nuttallii Gray, Proc. Am. Acad. **8**: 287. 1870.
Peucedanum graveolens Watson, Bot. King Surv. 128. 1871.
Peucedanum kingii Watson, Proc. Am. Acad. **22**: 474. 1887.
Peucedanum megarrhiza A. Nelson, Bull. Torr. Bot. Club **26**: 130. 1899.

Acaulescent, glabrous; scape 1.5 to 4.5 dm. high, a little exceeding the leaves, arising from a stout caudex becoming multicipital; leaves pinnate or bipinnate; leaflets linear, elongated, cuspidate, sometimes 5 cm. long; umbel somewhat equally 4 to 20-rayed, with involucels of linear-lanceolate bractlets; rays 3 to 3.5 cm. long; pedicels 2 to 6 mm. long; flowers yellow; calyx teeth evident; fruit oblong, 8 to 10 mm. long, 4 mm. broad, narrowly winged, the dorsal and intermediate ribs also sometimes irregularly winged; oil tubes 3 to 5 in the intervals, 6 to 10 on the commissural side; seed somewhat sulcate on the back, with slightly concave face.

Type locality, "Rocky Mountains;" collected by *Nuttall;* type in Herb. Columbia Univ.

Northern Utah, Wyoming, and western Nebraska.

Specimens examined:

UTAH: Wasatch Mountains, altitude 2,700 meters, *Watson* 463, July, 1869; on the Mooseneeah, altitude 2,700 to 3,000 meters, *Ward* 667, 697, June–August, 1875.

WYOMING: Evanston, Uinta County, *Nelson* 2958, May 28, 1897; Point of Rocks, *Nelson* 4769, June 16, 1898 (type of *P. megarrhiza* Nelson).

NEBRASKA: Scotts Bluff, in the pass, *Rydberg* 129, July 22, 1891.

2. **Cynomarathrum alpinum** (Watson) C. & R.

Peucedanum graveolens alpinum Watson, Bot. King Surv. 129. 1871.
Peucedanum kingii alpinum C. & R. Rev. N. Am. Umbell. 71. 1888.

Resembling a dwarf form of *C. nuttallii*, with scapes 1 to 2.5 cm. high; leaves about 7.5 cm. long, mostly simply pinnate, with 3 to 5 pairs of linear and entire leaflets; umbel 3 to 6-rayed, with involucels of narrow bractlets; rays 2.5 to 5 cm. long; pedicels 8 to 12 mm. long; flowers yellow; calyx teeth evident; fruit linear-oblong, 4 to 7 mm. long; oil tubes very obscure, 1 or 2 in the intervals, 4 to 6 on the commissural side.

Type locality, "East Humboldt Mountains, [N.] Nevada," altitude 2,700 meters; collected by *Watson*, no. 464, August, 1868; type in U. S. Nat. Herb.

Mountains of Nevada.

Specimens examined:

NEVADA: Type specimens as cited under type locality; Glenecoe, *Jones*, June 30, 1891; Highland Peak, altitude 2,400 to 2,700 meters, *Purpus* 6282, in 1898.

3. **Cynomarathrum parryi** (Watson) C. & R.

Peucedanum parryi Watson, Proc. Am. Acad. **11**: 143. 1876.
Peucedanum scopulorum Jones, Contr. to Western Botany no. 8: 31. 1898.

Acaulescent, glabrous; stems tufted, their bases clothed with old leaf sheaths; leaves lanceolate in outline, twice pinnate, 1 to 3 dm. long, sometimes longer than the peduncles, pale; pinnæ distant; segments linear and sharp-pointed; rays 5 to 10, nearly equal, 2.5 to 3 cm. long; pedicels slender, 12 to 16 mm. long; involucels of several green rather conspicuous unilateral bractlets usually cleft at apex; fruit glabrous, oblong, 10 to 12 mm. long; lateral wings about as broad as body; calyx teeth evident; oil tubes obscure; flowers apparently yellow.

Type locality, "southern Utah," in the Valley of the Virgin, in the vicinity of St. George, Washington County; collected by *Parry*, no. 85, in 1874; type in Herb. Gray.

Specimens examined:

NEVADA: Charleston Mountains, *C. A. Purpus* 6086, May–October, 1898.

UTAH: Type specimens as cited under type locality; Silver Reef, *Jones* 5449, May 3, 1894.

CALIFORNIA: Pleasant Canyon, Panamint Mountains, Inyo County, *Jones*, May 6, 1897 (type of *Peucedanum scopulorum* Jones).

Peucedanum parryi has long been made to include certain peculiar species of *Peucedanum* with tufted stems, narrow leaves, prominent calyx teeth, etc. In fact, until recently rediscovered by Mr. Jones, the only specimen of true *P. parryi* was the type collection of which no material is to be found in the U. S. National Herbarium. A recent comparison of the type sheet with a duplicate type of Mr. Jones's *P. scopulorum* convinces us that the two are identical. We have also taken out several forms which have heretofore passed as *P. parryi*. Several flowering specimens are left doubtful, as their generic position can not be decided definitely without fruit.

4. **Cynomarathrum brandegei** C. & R.

Peucedanum brandegei C. & R. Bot. Gaz. **13**: 210. 1888.

Short caulescent, glabrous, 1 to 4 dm. high, from a thick elongated root; leaves ternately decompound; the ultimate segments lanceolate, 2.5 cm. long, 3 to 6 mm. wide, cuspidate pointed; umbel 6 to 12-rayed, with involucels of few linear or setaceous bractlets; rays 6 to 12 mm. long, pedicels not more than 2 mm., both reflexed at maturity; flowers yellow; calyx teeth evident; fruit oblong, 4 to 5 mm. long, 4 mm. broad, with wings about half as broad as body, and prominent or even

slightly winged dorsal and intermediate ribs; oil tubes 2 to 4 in the intervals, 4 or 6 on the commissural side.

Type locality, "Wallawalla region, Washington;" collected by *Brandegee*, no. 799, May, 1883; type in Herb. Coulter.

Eastern Washington.

Specimens examined:

WASHINGTON: Type specimens as cited under type locality; *C. R. Vasey* 296, in 1889; *Sandberg & Leiberg* 516, in 1893; "along Twisp River," *Whited*, July 20, 1896; Bridge Creek, Okanogan County, altitude 1,950 meters, *Elmer* 651, September, 1897; Washington Forest Reserve, *Gorman* 610, August 14, 1897, Mount Stuart, Kittitas County, altitude 1,800 meters, *Elmer* 1116, August, 1898.

5. **Cynomarathrum eastwoodae** C. & R., sp. nov. FIG. 63.

Stems low, much tufted at base; leaves shorter than the peduncles, very narrow in outline, once to twice pinnate, very scabrous; segments short and narrow, apiculate; rays few, nearly equal, 2 to 2.5 cm. long; pedicels 12 to 18 mm. long, usually longer than the fruit; involucels of several linear entire bractlets; fruit glabrous, oblong, 8 to 10 mm. long, with wings nearly as broad as body; calyx teeth evident.

Type locality, Grand Junction, Colorado; collected by *Alice Eastwood*, May, 1892; type in U. S. Nat. Herb.

Colorado.

Specimens examined:

COLORADO: Type specimens as cited under type locality; same station, *Alice Eastwood*, May 18, 1891; same station, *E. Bethel*, June 20, 1898; low plains, Mesa County, *H. C. Long*, in 1893.

6. **Cynomarathrum scabrum** C. & R., sp. nov.

Acaulescent; stems tufted, their bases clothed with old leaf sheaths; leaves very scabrous, narrowly lanceolate in outline, bipinnate; ultimate segments short ovate and apiculate; peduncles 1 to 2 dm. long; involucels of small linear setaceous bractlets somewhat scarious and united at base; rays 1 to 3.5 cm. long; pedicels 2 to 6 mm. long; flowers probably yellow; calyx teeth evident; fruit oblong, glabrous, 7 to 9 mm. long, 4 to 6 mm. broad, with wings half as broad as body, and filiform dorsal and intermediate ribs stronger at base and apex; oil tubes 3 to 5 in the intervals, small, 4 to 10 on the commissural side.

Type locality, Frisco, Utah, altitude 2,400 meters; collected by *Marcus E. Jones*, no. 1864, June 22, 1880; type in U. S. Nat. Herb.

Only known from type locality.

Specimens examined:

UTAH: Type specimens as cited under type locality.

This species was first distributed as *Peucedanum incrudens*, and afterwards confused with *P. parryi*, from which it differs in its scabrous foliage, broader leaf segments, etc.

61. **HERACLEUM** L. Sp. Pl. 1: 249. 1753.

Calyx teeth small or obsolete. Fruit broadly obovate, very much flattened dorsally, somewhat pubescent. Carpel with dorsal and intermediate ribs filiform: the broad lateral wings contiguous to those of the other carpel, strongly nerved toward the outer margin; strengthening cells continuous about seed cavity and under the nerves. Stylopodium thick conical. Oil tubes solitary in the intervals, conspicuous, about half as long as the carpel, 2 to 4 on the commissural side. Seed very much flattened dorsally.

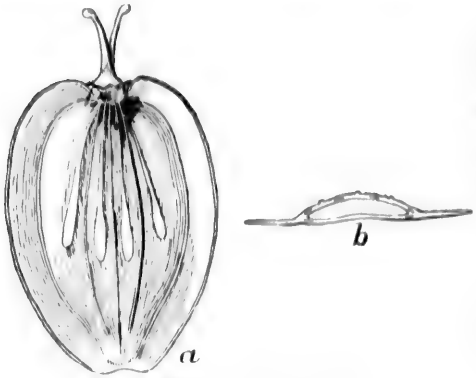


FIG. 64.—Heracleum lanatum: *a*, *b*, × 4.

Tall stout perennials, with large ternately compound leaves, deciduous involucres, involucels of numerous bractlets, large many-rayed umbel of white flowers, and obcordate petals (the outer ones often dilated and 2-cleft).

First species cited, *Heracleum sphondylium* L.

A genus of about 60 species, belonging to the northern hemisphere, represented in North America by a single species.

1. **Heracleum lanatum** Michx. Fl. Bor. Am. 1: 166. 1803. FIG. 64.

Very stout, 12 to 24 dm. high, pubescent or woolly above; petioles much dilated; leaflets petiolulate, rounded-cordate, 10 to 25 cm. broad, irregularly cut-toothed; rays 5 to 15 cm. long; fruit 8 to 12 mm. long, somewhat pubescent.

Type locality, "Canada."

Wet ground, from Canada to North Carolina and Tennessee, and extending westward to New Mexico, California, and Alaska.

Specimens examined: We cite but few of the numerous sheets examined of this abundant and widespread species.

VERMONT: Peacham, *Alice Stevens*, August 5, 1892.

MASSACHUSETTS: Ipswich, *Oakes*.

CONNECTICUT: Fairfield, *Eames*, June 14, 1894.

NEW YORK: Ithaca, *Univ. Coll.*, June, 1875.

PENNSYLVANIA: Lancaster, *Small*, June 4, 1889.

NORTH CAROLINA: Roan Mountain, altitude 1,800 meters, *Merriam*, September 1, 1892.

TENNESSEE: Cocke County, *Kearney* 707, August 28, 1897.

OHIO: Lancaster, *Bigelow*.

IOWA: Grinnell, *Jones*, June 19, 1877.

SOUTH DAKOTA: Black Hills, *Rydberg*, altitude 1,200 meters, June 28, 1892.

NEBRASKA: Newcastle, *Clements*, in 1893.

COLORADO: Mancos, *Baker, Earle, & Tracy* 580, July 9, 1898.

WYOMING: National Park, *Knowlton*, July 11, 1888.
MONTANA: Near Red Lodge, *Rose*, July 26, 1893.
IDAHO: Nez Perces County, *Sandberg*, May 27, 1892.
UTAH: Wasatch Mountains, altitude 1,800 meters, *Watson* 471, July, 1869.
NEVADA: Northern Nevada, *Watson*, in 1868.
CALIFORNIA: Tulare County, *Orcutt & Funston* 1368, July 29, 1891; Siskiyou County *Palmer* 2544, July, 1892.
OREGON: Near Fort Klamath, altitude 1,470 meters, *Leiberg* 674, August 7, 1894.
WASHINGTON: Spokane River, *Wilkes Exped.* 397.
ALASKA: Yes Bay, *Howell* 1760, July 16, 1895; Bering Island, *James Macoun*, September 1, 1891; Yakutat Bay and Kadiak Island, *Trelease* 4522, 4523, 4524, June 19–July 20, 1899; Tongass village, *Brewer & Coe* 593, July 26, 1899.

For description of introduced species, see page 256.

62. DAUCUS L. Sp. Pl. 1: 242. 1753.

Calyx teeth obsolete. Fruit oblong, flattened dorsally. Carpel with 5 slender bristly primary ribs, and 4 winged secondary ones each bearing a single row of prominent barbed prickles. Stylopodium depressed

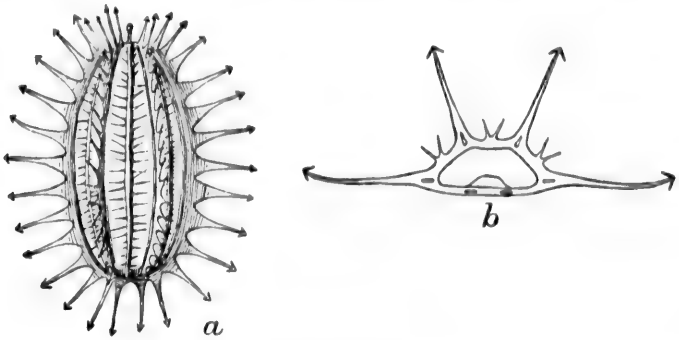


FIG. 65.—Daucus pusillus: *a*, *b*, × 8.

or wanting. Oil tubes solitary in the intervals (that is, under the secondary ribs), 2 on the commissural side. Seed flattened dorsally; the face somewhat concave or almost plane.

Bristly annuals or biennials, with pinnately decompound leaves, foliaceous and cleft involucral bracts, involucels of entire or toothed bractlets, and usually white flowers in concave umbels (connivent in fruit).

First species cited, *Daucus carota* L.

A genus of about 60 species, of wide distribution, chiefly displayed in the Mediterranean region, and represented in our flora by a single wide-ranging species.

1. **Daucus pusillus** Michx. Fl. Bor. Am. 1: 164. 1803. FIG. 65.

Stems prevailingly simple, papillate hispid, from 2.5 to 60 cm. high; leaves finely dissected into narrowly linear segments; umbels unequally few to many-rayed, forming a rather compact head; rays 1 to 3.5 cm.

long; pedicels very unequal, from 16 mm. long to almost wanting; fruit 3 to 5 mm. long.

Type locality, "in campestribus Carolinae."

From the Carolinas and Florida to California, thence northward to Vancouver Island.

Specimens examined:

South Carolina: Columbia, *Taylor*.

Florida: Near Jacksonville, *Curtiss* 4343, 4756, May–June, 1893 and 1894.

Mississippi: Point St. Martin, *Tracy*, May 15, 1898.

Missouri: Eagle Rock, *Bush*, June 22, 1897.

Indian Territory: *Sheldon*, June 19, 1891.

Arkansas: Fort Smith, *Bigelow*, in 1853–54; northwestern Arkansas, *Harvey*.

Texas: Western Texas, *Wright* 1386, in 1852; Gillespie County, *Jermy* 478; near Eagle Pass, *Havard*, May, 1883; Fort Worth, *Dewey*, June 8, 1891; Nueces County, *Heller* 1438, April, 1894; San Antonio, *Marlatt*, May, 1896.

New Mexico: Grant County, *Mearns* 40, May 3, 1892.

Arizona: Yucca, *Jones*, May 17, 1884; Tucson, *Myrtle Zuck*, May 16, 1896.

California: Monterey, *Parry*, in 1850; *Bigelow*, in 1853–54; Borax Lake, *Torrey* 161, in 1865; Santa Cruz, *Jones* 2319, June 30, 1881; Kern County, altitude 1,000 meters, *Coville & Funston* 1114, June 25, 1891; Marin County, *Palmer* 2306, June, 1892; Amador County, *Hansen* 1765, June 25, 1896; Santa Catalina and San Nicholas islands, *Blanche Trask*, March–April, 1897; Mendocino County, *Brown* 738, May, 1898.

Oregon: *Wilkes Exped.*

Washington: Klickitat County, *Suksdorf*, June, 1881; San Juan County, *Henderson*, July 3, 1892; Kitsap County, *Piper*, July 15, 1895.

British Columbia: Near Nanaimo, Vancouver Island, *Macoun* 308, July 14, 1895.

For description of introduced species, see page 256.

INTRODUCED GENERA AND SPECIES.

1. **HYDROCOTYLE** L. Sp. Pl. **1**: 234. 1753.—For description of genus and native species, see page 25.

Hydrocotyle bonariensis Lam. Encycl. **3**: 153. 1789. Although seeming well established in many places the South, this species is generally considered as an introduction from South America. It is often reported from ballast heaps in the South.

2. **ERYNGIUM** L. Sp. Pl. **1**: 232. 1753.—For description of genus and native species, see page 42.

Eryngium campestre L. Sp. Pl. **1**: 233. 1753, a European species, was found on ballast grounds of Maryland, at Baltimore, by *Katherine A. Taylor*, and at Canton by *B. Sollers*, both in 1894, and again at Baltimore in 1898 by *C. C. Plitt*.

Eryngium foetidum L. Sp. Pl. **1**: 232. 1753, a West Indian species, was reported by Michaux as having been found by him in dry fields in Florida, and was said by Pursh to occur in Georgia and Florida, but never having been found subsequently it should probably be excluded from the flora of the United States.

Eryngium nasturtiifolium Juss. in Delar. Eryng. 46. pl. 17. 1808, a Mexican species, was found by *G. C. Nealley* at Santa Maria, Texas, in 1889.

Eryngium planum L. Sp. Pl. **1**: 233. 1753, a European species, was collected in 1899 by *E. S. Steele*, growing spontaneously on a terrace along Massachusetts avenue, Washington, D. C.

Eryngium divaricatum H. & A. in Hook. Bot. Misc. **3**: 350. 1833. From time to time for the last several years an *Eryngium* has been reported from the Southern States differing from any native species as well as from all material in the National

Herbarium. It was suspected to be an introduced species and was therefore forwarded to Mr. W. Botting Hemsley at Kew, who has recently given much attention to this genus. While reading page proof the following report is received from him: "The introduced *Eryngium* is *E. flaccidum* H. & A. which I think is not specifically different from their *E. divaricatum*." We have material from Wilmington, N. C., and Pensacola, Fla. (*Curtiss*).

3. **CHAEROPHYLLUM** L. Sp. Pl. **1**: 258. 1753.—For description of genus and native species, see page 58.

CHAEROPHYLLUM TEMULUM L. Sp. Pl. **1**: 258. 1753, an Old World species, was found by *Martindale* on ballast near Philadelphia, in 1878, and distributed as *C. sylvestre* L.

CHAEROPHYLLUM BULBOSUM L. Sp. Pl. **1**: 258. 1753, a European species, was collected in 1899 by *E. S. Steele* near the fish ponds, Washington, D. C., where it seems to be spreading.

4. **ANTHRISCUS** Bernh. Syst. Verz. Erf. 113. 1800.—A genus resembling *Chaerophyllum* in general habit, but the beaked fruit is without ribs, and there are no oil tubes or strengthening cells. An Old World genus containing about 13 species, represented in our flora by two naturalized species and one waif.

Fruit glabrous.

Foliage coarse; fruit with short beak ..... *A. silvestris.*

Foliage much dissected; fruit with long beak ..... *A. cerefolium.*

Fruit bristly pubescent ..... *A. anthriscus.*

ANTHRISCUS SILVESTRIS (L.) Hoffm. Gen. Umbell. 40. 1814. A waif on Staten Island, N. Y.; collected at New Dorp by *Britton*, June 11, 1895; at same station, by *Tyler*, June 29, 1897. The specimens referred to this species in our former *Revision* prove to be *Chaerophyllum temulum* L.

ANTHRISCUS CEREFOLIUM (L.) Hoffm. Gen. Umbell. 41. 1814. Naturalized in eastern and southern Pennsylvania; collected at Lancaster and Bethlehem by *Porter* in 1861 and 1890, and at Lancaster by *Small;* also collected at Columbia, S. C., by *Miss K. A. Taylor*, April 26, 1888; and in Grand River Valley, Oreg., by *Cusick* (no. 1760*a*), in 1897.

ANTHRISCUS ANTHRISCUS (L.) Karst. Deutsch. Fl. 857. 1880–1883 (*A. vulgaris* Pers.), the common "bur chervil" of Europe, seems to be naturalized as a weed in the streets of Alameda, Cal., having been collected by *Lemmon* and by *Dr. Gibbs* in 1889; also found as a waif in Nova Scotia by *Macoun*.

5. **SCANDIX** L. Sp. Pl. **1**: 256. 1753.—A genus which differs from *Anthriscus* in its ribbed fruit, which extends into a conspicuous beak much longer than the body. An Old World genus containing about 10 species, and represented in our flora by a single species, which seems to be naturalized in some localities.

SCANDIX PECTEN-VENERIS L. l. c., the "shepherd's needle" or "Venus-comb" of Europe and Western Asia, is naturalized in Napa Valley, California, where it has been collected by *Somme*. Found also at Brighton, N. J., by *Britton*, July 21, 1888; in Passaic County, N. J., by *Nash*, May 22, 1891; near Washington, D. C., by *Kearney*, June 4, 1898, and at Statesville, N. C., by *Hyams*, June, 1878.

6. **TORILIS** Adans. Fam. **2**: 99. 1763.—A genus which differs from *Caucalis* in its sulcate rather than involute seed face, and its fruit covered with strong spines (rather than in definite rows between the ribs). A genus of the Eastern Hemisphere, containing about 23 species, most of which are in the general Mediterranean region. The two following species have become naturalized within our range:

Umbels opposite the leaves, sessile, or on short peduncles; leaves finely dissected. *T. nodosa.*

Umbels terminal or axillary, on slender peduncles; leaves not finely dissected. *T. anthriscus.*

TORILIS NODOSA (L.) Gaertn. Fruct. **1**: 82. pl. 20. f. 6. 1788 (*Tordylium nodosum* L.; *Caucalis nodosa* Scop.), a native of Europe and northern Africa, has been introduced into Chile and Peru, and thence introduced and naturalized in California, from whence our specimens have been collected as follows: Near San Francisco, *Jones* 3265, May 16, 1882; near Chico, Butte County, *Palmer* 2073, June 7–12, 1892; same station, *Mrs. R. M. Austin* 684, May, 1896; Amador County, *Hansen* 1713, June 7, 1896; near Clear Creek, Butte County, *Brown* 192, April 1–15, 1897; Santa Lucia Mountains, Monterey County, *Plaskett*, April, 1898. Collected also in Texas by *Hall* (no. 259), near Austin, May 16, 1872, and apparently naturalized; also on ballast ground at Port Eads (*Langlois*), Baltimore (*Foreman* in 1876), and Philadelphia (*Martindale*); and reported from Ames, Iowa (*Burgess*).

TORILIS ANTHRISCUS (L.) Gmel. Fl. Bad. **1**: 615. 1805 (*Tordylium anthriscus* L.; *Caucalis anthriscus* Huds.), a European species, seems to be naturalized near Buffalo, N. Y. (*Clinton*), Cincinnati, Ohio (*Lloyd* in 1879), and Painesville, Ohio (*Werner*). It is reported also from ballast at Baltimore (*Sollers* in 1890), and from dumps near Washington, D. C. (*Miss Dorsey* in 1894).

7. **CAUCALIS** L. Sp. Pl. **1**: 240. 1753.—For description of the genus and native species, see page 69.

CAUCALIS LATIFOLIA L. Syst. Nat. ed. 12. **2**: 205. 1767, a species of Europe and temperate Asia, with umbels on slender peduncles, and large spiny fruit, has been collected on ballast near Philadelphia (*Martindale* in 1877).

8. **CORIANDRUM** L. Sp. Pl. **1**: 256. 1753.—A genus resembling *Bifora* in general habit, but the fruit is globose and not at all constricted at the commissure. An Old World genus of two species, represented in our flora by the following garden form.

CORIANDRUM SATIVUM L. l. c., the common coriander of the eastern Mediterranean region, has frequently escaped from cultivation, and is probably established. Our specimens are as follows: Statesville, N. C., *Hyams*, in 1879; Marthas Vineyard, *Burgess*, in 1893; Brookings, S. Dak., *Williams*, in 1893; Unionville Valley, Nevada, *Watson* in 1868; Los Angeles, Cal., *Hasse*, in 1888. Collected also on ballast at Philadelphia (*Martindale*) and Portland, Oreg. (*Henderson*).

9. **BIFORA** Hoffm. Umb. Gen. ed. 2. 191. 1816.—For description of the genus and native species, see page 70.

BIFORA RADIANS Bieb. Fl. Taur. Cauc. Suppl. 233. 1819, a species of the Mediterranean region, was collected on ballast near Philadelphia (*Martindale*) and Providence (*Bennett*), but has not been reported since.

10. **CONIUM** L. Sp. Pl. **1**: 243. 1753.—A genus of poisonous biennials, with spotted stems, large decompound leaves with lanceolate pinnatifid leaflets, involucre and involucels of narrow bracts, white flowers, and ovate glabrous fruit with prominent wavy ribs and no oil tubes.

CONIUM MACULATUM L. l. c., a large branching European species, and the type of the genus, is naturalized in waste places throughout the Northeastern States and Canada; also found in California. Our material is as follows: Ontario, *Macoun* 4973, August 18, 1894; Manchester, Vt., *M. A. Day* in 1898; Ithaca, N. Y., *McCarthy, Rowlee;* Lancaster, Pa., *Small*, June, 1893; San Francisco, Cal., *Kellogg & Harford* 303, June 12, 1868; near Chico, Butte County, Cal., *Palmer* 2093, June 7–12, 1892; Truckee, Cal., *Sonne* 5, July, 1892; Sacramento River, California, *Mrs. Austin* 270.

11. **BUPLEURUM** L. Sp. Pl. **1**: 236. 1753.—For description of the genus and native species see page 84.

BUPLEURUM ROTUNDIFOLIUM L. Sp. Pl. **1**: 236. 1753, with ovate perfoliate leaves, is introduced from Europe, and is common in fields and cultivated ground, from New Hampshire to North Carolina, and westward to South Dakota, Missouri, and Arizona. Our material is as follows: Lancaster County, Pa., *Carter*, in 1864; Capitol View, Md.,

Miller, in 1898; Shenandoah Valley, Virginia, *Ward*, in 1891; Chapel Hill, N. C., *Ashe;* Rowan County, N. C., *Small & Heller* 62, in 1891; near Nashville, Tenn., *Gattinger;* near Knoxville, Tenn., *Scribner*, in 1890; same station, *Ruth*, in 1895 and 1898; Brookings, S. Dak., *Williams*, in 1893; Clay County, Mo., *Mackenzie*, in 1897; Tucson, Ariz., *Toumey*, in 1892.

Bupleurum protractum Hoffmgg. & Link, Fl. Port. **2**: 387. 1820 (?), from the Mediterranean region, which differs from *B. rotundifolium* chiefly in its tuberculate fruit, was collected on ballast ground near Philadelphia by *Martindale*, but has not been reported since.

Bupleurum odontites L. Sp. Pl. **1**: 237. 1753, from Europe, to be recognized by its linear-lanceolate leaves, is reported by *Deane* as introduced in Massachusetts.

12. **CUMINUM** L. Sp. Pl. **1**: 254. 1753.—A genus which differs from *Trepocarpus* in its rose-colored flowers and bristly fruit. A monotypic genus of the Mediterranean region.

Cuminum cyminum L. l. c., the common "cumin" of the Orient, was found at El Paso, Tex., by *Wright* in 1852, and along the banks of the Rio Grande near El Paso by *Lemmon* in 1881. It is a small slender annual 7.5 to 25 cm. high, with long filiform leaflets and similar involucre and involucels.

13. **APIUM** L. Sp. Pl. **1**: 264. 1753.—For description of the genus and native species see page 86.

Pinnate leaves with 1 or 2 pairs of broadly cuneate-obovate or rhomboidal lobed and toothed leaflets ..... *A. graveolens.*
Pinnate leaves with oblong and serrate leaflets ..... *A. nodiflorum.*

Apium graveolens L. Sp. Pl. **1**: 264. 1753, the common garden celery, is a native of the coasts of Europe, but has become widely naturalized, especially in the salt marshes of southern California. Our material is as follows: Duncans Mills, Cal., *Jones* 3604, in 1882; near San Diego, Cal., *Orcutt* 1299, in 1884; near Los Angeles, Cal., *Tracy*, in 1887; near Phoenix, Ariz., *Dewey*, in 1891; also collected on ballast near Philadelphia (*Martindale*).

Apium nodiflorum (L.) Reichb. f. Ic. Fl. Germ. **21**: 10. 1867 (*Sium nodiflorum* L.), a native of Europe, was reported by *Walter* as abundant near Charleston, S. C., but was not afterwards reported until specimens were obtained by *Mellichamp;* also found on ballast near Philadelphia (*Martindale*).

Apium repens (L.) Reichb. f. Ic. Fl. Ger. **21**: 10. 1867 (*Sium repens* L.), a European species, was found on ballast near Philadelphia by *Martindale*, but has not been reported since.

14. **PETROSELINUM** Hoffm. Gen. Umb. 78. 1814.—A genus which differs from *Apium* and *Carum* in its yellow or greenish-yellow flowers, and kept distinct from both by Drude. A genus of Europe and the Mediterranean region, containing 5 species.

Petroselinum petroselinum (L.) Karsten Deutsch. Fl. 831. 1880–1883 (*Apium petroselinum* L.; *Carum petroselinum* Benth. & Hook.), the cultivated parsley, a native of the Mediterranean region, has become naturalized in several places. Our material is as follows: Anne Arundel County, Md., *J. Donnell Smith*, in 1878; Iowa, *Miss C. Harrison*, in 1889; San Antonio, Tex., *Heller* 1838, in 1894; Garnett, Lincoln County, Ark., *E. N. Plank;* also reported by *Macoun* as spontaneous in Canada.

15. **AMMI** L. Sp. Pl. **1**: 243. 1753.—A genus which suggests *Daucus* in its inflorescence, but with very different fruit. A genus of Europe and Africa, containing 7 species, 2 of which have been found occasionally in our flora.

Inflorescence open in fruit ..... *A. majus.*
Inflorescence incurved in fruit, forming a compact cluster ..... *A. visnaga.*

Ammi majus L. l. c. was reported by De Candolle (Prodr. **4**: 112) as found in

Newfoundland by Pylaie, but has not been discovered since. It has also been collected on ballast near Philadelphia by *Martindale* and *Parker*.

AMMI VISNAGA (L.) Lam. Fl. Fr. **3**: 462. 1778 (*Daucus visnaga* L. Sp. Pl. **1**: 242. 1753), from the Mediterranean region, has been collected on ballast near Philadelphia (*Martindale* in 1879), and near Portland, Oreg. (*Henderson* in 1887).

16. **CARUM** L. Sp. Pl. **1**: 263. 1753.—For description of genus and native species, see page 103.

CARUM CARUI L. Sp. Pl. **1**: 263. 1753, the common garden caraway from Europe, and the type of the genus, has become naturalized in many places, especially in the north and northwest. It may be recognized by its pinnately compound leaves with very narrow and often filiform entire or toothed divisions. Our material is as follows: Newfoundland (*Osborn* in 1879); Jeffrey, N. H. (*Deane* in 1889 and 1890); Manchester, Vt. (*M. A. Day* in 1898); Easton, Conn. (*Evans* in 1895); Norfolk, Va. (*Ward* in 1877); Ithaca, N. Y. (*Univ. Coll.* in 1880); Westmoreland County, Pa. (*Pierson* in 1877); Lebanon County, Pa. (*Heller & Small* in 1891); Monroe County, Pa. (*Britton* in 1893); Lorain County, Ohio, (*Ricksecker* in 1895); Naperville, Ill. (*Umbach* in 1898); Dakota County, Minn. (*Mearns* in 1891); Black Hills, S. Dak. (*Rydberg* in 1892); Brookings, S. Dak. (*Thornber* in 1893); Fort Collins, Colo. (*Coleen* in 1893).

17. **PIMPINELLA** L. Sp. Pl. **1**: 263. 1753.—A genus which differs from *Tuenidia* in its pinnate leaves, conical stylopodium, almost obsolete ribs, and white flowers. A widely distributed genus of the Old World, containing about 70 species.

PIMPINELLA SAXIFRAGA L. Sp. Pl. **1**: 263. 1753, a European species, and type of the genus, has been somewhat widely introduced. Our material is as follows: New Brunswick, *John Britton*, August 30, 1890; roadsides near Easton, Pa., *Porter*, July 30, 1895; Sycamore, Ohio, *Rusby* in 1878. It may be distinguished by its broad leaflets.

PIMPINELLA ANISUM L. Sp. Pl. **1**: 264. 1753, the cultivated anise from the eastern Mediterranean, is reported by *Deane* as occurring wild in Massachusetts. It may be known by its very narrow and shining leaf segments.

18. **AEGOPODIUM** L. Sp. Pl. **1**: 265. 1753.—A genus which differs from *Pimpinella* in its ternate leaves, large ovate leaflets, and absence of oil tubes. A genus of Europe-Siberia, containing 2 species.

AEGOPODIUM PODAGRARIA L. l. c., a troublesome weed in Europe and Siberia, is sparingly introduced. Our material is as follows: Watertown, Mass. (*Deane* in 1894); Cambridge, Mass. (*Robinson* in 1895); Rohrerstown, Pa. (*Small* in 1890). We have also had it from near Woodside, Long Island (*Brown* in 1877); Newark, Del. (*Commons*); and Providence, R. I. (*Bailey*).

19. **OENANTHE** L. Sp. Pl. **1**: 254. 1753.—For description of genus and native species see page 121.

OENANTHE PHELLANDRIUM Lam. Fl. Fr. **3**: 432. 1778, a species of Europe and northern Asia, was found by *E. S. Steele*, June 10, 1897, near fish ponds on the grounds of the Washington Monument. It may be recognized by its fibrous roots (with no rootstock as in our native species), and rather small finely dissected leaves.

20. **AETHUSA** L. Sp. Pl. **1**: 256. 1753.—A genus which resembles *Apium* and *Petroselinum*, but differs in its more finely divided leaves, globose-ovoid fruit (not flattened either way), and prominent thick and sharp ribs. A monotypic genus of Europe and Asia.

AETHUSA CYNAPIUM L. l. c., a fetid poisonous herb known as the "fool's parsley" or "dog's parsley," has become rather widely introduced in waste and cultivated ground. Our material is as follows: Ipswich, Mass. (*Oakes; Morong* in 1875); ballast near Camden, N. J. (*Martindale* in 1878); Tinicum, Delaware County, Pa. (*Porter* in 1899). Reported also at various stations from Nova Scotia and New England to Minnesota.

21. **FOENICULUM** Adans. Fam. Pl. **2**: 101. 1763.—A genus of stout and glabrous aromatic herbs, with leaves (often large) dissected into numerous filiform segments, no involucre or involucels, large umbels of yellow flowers, oblong glabrous fruit terete or nearly so and with prominent ribs, and solitary oil tubes. An Old World genus containing about 4 species.

FOENICULUM FOENICULUM (L.) Karst. Deutsch. Fl. 837. 1880–1883 (*Anethum foeniculum* L. Sp. Pl. **1**: 263. 1753; *Foeniculum vulgare* Gaertn. Fruct. & Sem. **1**: 105. pl. 23. fig. 5. 1788), the common cultivated fennel from Europe, has become naturalized in waste ground. Our material is as follows: Weehawken, N. J. (*Van Sickle*); Guttenberg, N. J. (*Van Sickle* in 1894); Delaware County, Pa.; Fortress Monroe, Va. (*Chickering* in 1884); Hampton, Va. (*Steele* in 1895); Statesville, N. C. (*Hyams* in 1878); Knox County, Tenn. (*Ruth* in 1898); Texas (*Nealley* in 1883); Dorsey, Nebr. (*Clements* in 1893); Los Angeles, Cal. (*Hasse* in 1888 and 1890); Santa Catalina Island, Cal. (*Blanche Trask* in 1896).

22. **ANETHUM** L. Sp. Pl. **1**: 263. 1753.—A genus with the habit of *Foeniculum*, and fennel-like leaves, but with the fruit of a *Peucedanum* with narrow lateral wings. A genus of 2 species, indigenous in the Orient.

ANETHUM GRAVEOLENS L. Sp. Pl. **1**: 263. 1753 (*Peucedanum graveolens* Benth. & Hook. Gen. Pl. **1**: 919. 1867), the cultivated anise or dill, has escaped from cultivation and become established in waste places at Wilmington, Del. (*Tatnall*), in waste ground about Chicago, Ill. (*Umbach* in 1897), at Los Angeles, Cal. (*Hasse* in 1889), at Wandotte, Ark. (*Plank*), and probably at other places.

23. **LEVISTICUM** Koch, Nov. Act. Caes. Leop. Acad. **12**: 101. 1824.—A genus resembling *Ligusticum*, but differing in the fruit flattened dorsally and ribbed as in *Angelica*, and in its yellow or greenish-yellow flowers. A monotypic genus of southern Europe.

LEVISTICUM LEVISTICUM (L.) Karst. Deutsch. Fl. 844. 1880–1883 (*Ligusticum levisticum* L. Sp. Pl. **1**: 250. 1753; *Levisticum officinale* Koch, l. c.), to be recognized by its large ternate-pinnate leaves with broad thickish and veiny more or less cuneate leaflets toothed or lobed above, has become introduced in several places. Our material is from Enfield (Tompkins County), N. Y. (*Coville* in 1884), and Shelburn, Vt. (*Mrs. Nellie F. Flynn* in 1899). It is also reported by *Deane* from Connecticut.

24. **IMPERATORIA** L. Sp. Pl. **1**: 259. 1753.—A genus of tall plants, perhaps most closely related to *Angelica*, but our species differing in its once ternate leaves with very broad and stalked segments which are often 3-parted nearly or quite to the base, the fruit resembling small fruits of *Angelica*. A genus containing about 10 species, natives of the Old World. Bentham & Hooker, followed by Drude, have merged this genus with *Peucedanum*.

IMPERATORIA OSTRUTHIUM L. Sp. Pl. **1**: 259. 1753, a native of Europe, and the type of the genus, has been reported as introduced in Newfoundland, New York, Pennsylvania, and Michigan. Our single sheet is from Lyons, Mich. (*Dr. R. P. De Vore* in 1892).

25. **PASTINACA** L. Sp. Pl. **1**: 262. 1753.—A genus of stout plants, resembling *Heracleum* in fruit characters, but with pinnately compound leaves and yellow flowers. A genus containing about 14 species, natives of Europe and Asia.

PASTINACA SATIVA L. Sp. Pl. **1**: 262. 1753, the common parsnip, a native of Europe and the type species of the genus, has become a very common weed in North America. The following citations of a very few of the specimens examined may serve to indicate its range: Kingston, Ontario (*Fowler* in 1895); Manchester, Vt. (*Day* in 1898); Great Barrington, Mass. (*Pollard* in 1893); Greens Farms, Conn. (*Pollard* in 1894); Ithaca, N. Y. (*Univ. Coll.* in 1875); Lancaster County, Pa. (*Small* in 1890); Youngstown, Ohio (*Ingraham* in 1891); Naperville, Ill. (*Umbach* in 1897); Fort Snelling, Minn. (*Mearns* in 1896); Black Hills, S. Dak. (*Rydberg* in 1892); New-

castle, Nebr. (*Clements* in 1893); Helena, Mont. (*Kelsey* in 1888); Buena Vista, Colo. (*Crandall* in 1897); Provo, Utah (*Jones* in 1894); Nevada (*Watson* in 1868); Siskiyou County, Cal. (*Palmer* in 1892); Pierce County, Wash. (*Piper* in 1889).

26. **HERACLEUM** L. Sp. Pl. **1**: 249. 1753.—For description of genus and native species see page 248.

HERACLEUM SPHONDYLIUM L. Sp. Pl. **1**: 249. 1753, a native of Europe, and the first species cited under the genus, has been found on ballast near New York City by *Addison Brown*.

27. **DAUCUS** L. Sp. Pl. **1**: 242. 1753.—For description of genus and native species see page 249.

DAUCUS CAROTA L. Sp. Pl. **1**: 242. 1753, the original of the cultivated carrot, and a native of Europe and Asia, has become exceedingly common in North America, often being one of the most troublesome weeds. As contrasted with *D. pusillus* it may be recognized by its much more robust habit, broader leaf segments, and much larger umbels. It is needless to cite the specimens examined, as they come from every part of the United States, especially the northern portion. The flowers are usually white, with the central one of each umbel purple, but in specimens from Ithaca, N. Y. (*Rowlee* in 1891), the whole umbel is a bright canary yellow, while near Washington, D. C. (*Ward* in 1877 and *Mearns* in 1897) there occur forms with all the flowers of the umbel purple. A rose-colored form is reported by Millspaugh as common in West Virginia and published by him as "forma rosea" in West Va. Agr. Exp. Station Bull. 24: 369. 1892.

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